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Original Articles

REALITIES OF ORTHODONTICS

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IT IS an honor as well as a privilege to be able to address my brother members of the American Association of Orthodontists at this particular time. Coming after the impressiveness of the opening exercises and before the scientific and practical program, it is intended that this paper may better prepare our minds to absorb that which is to follow. We are at a stage in orthodontic progress and general world conditions wherein the time is more than mature for the promulgation of the carefully arranged program ahead of us.

That the affairs of the American Association of Orthodontists should have worked around to where the city of New Orleans should be the logical meeting-place has been most fortunate. For this meeting to be conducted under the leadership of our President, Claude R. Wood, marks his ascendancy to the highest honor within our power to bestow upon him after years of faithful and brilliant service to the Association. As the result of his own intimate and highly trained knowledge, as well as the combined abilities of the officers and committeemen with whom he is surrounded, this meeting is outstanding because they have taken advantage of every opportunity which the general situation offers.

It so happened that the first fourteen years of my professional career were spent in Atlanta, Ga., and that year after year I attended dental meetings throughout the Southern states. As a native Southerner, it is my natural instinct to enjoy the successes, share the sorrows, and travel toe-to-toe with my Southern brothers and friends. To this extent I feel the personal right to emphasize the words of welcome you have just heard. In behalf of "we Southerners" may I be indulged in expressing again the sincerity of our greetings.

It so befell my lot from the unseen but ever-guiding hands of Fate to have had my future suddenly diverted from its expectant channels, when in the year of 1917 I left my beloved Southland. The last twenty-five years have been spent

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in other sections, where also have been found fertile fields in which to labor with a host of loyal and lovely friends. In their behalf Mr. President, may I extend to you, your officers, and our members in the South, our salutations, congratulations over the program you have arranged, and everlastingly our best wishes.

In the city of New York, it has long been my privilege to meet many professional men, both medical and dental, who have come there from the Latin-American countries for the purpose of study and gaining knowledge. It has always been my deep and abiding feeling that for the mutual benefit and the common good, we should exchange and share with each other the fruits of our experiences, which are bringing about an ever-increasing and crystallizing knowledge in our chosen profession. It is with special pleasure that I wish again to repeat in behalf of *all* the members of the American Association of Orthodontists, both in the United States and Canada, the sincerity of our hearts in the welcome which we combine to extend to our professional friends from the countries of Central and South America, who have come here to participate in, or who even though absent may share in the benefits of, this Inter-American Orthodontic Congress.

To the extent that we all as individuals and collectively are forced to accept our lot and share in the realities of life as they are today, so should we in our professional organizations face the realities of orthodontics in our work. The realities of life represent the sum total of the accumulations of the past, the accomplishments of today, and the influence which these two elements cast upon the hopes of tomorrow. Whether it be the factual existence of an individual, a group, a community, a nation, a hemisphere, or a world, that we are dealing with, it is nonetheless a reality. A study of the progressive history of the profession of dentistry is intensely interesting in this respect.

It was my privilege to have known many of the brilliant dentists of the South: among them such men as Dr. H. H. Johnson of Macon and Dr. Rollo Knapp of New Orleans, who back as early as 1890 were among the first to construct and insert fixed bridge work. . . . Dr. Charles L. Alexander of Charlotte, who was one of the first men to make an inlay by means of a burnished pure gold matrix and stamped cusps filled between with solder. . . . Dr. Frank Holland of Atlanta, one of the most brilliant soft gold workers of all time. . . . Dr. William Cranshaw of Atlanta, one of the early Nestors of periodontia. . . . Dr. B. Holly Smith of Baltimore, who was one of the great leaders of organized dentistry in its earlier history. . . . Dr. Henry W. Morgan of Nashville, one of the great dental educators of the South. . . . Dr. Thomas P. Hinman of Atlanta, in whose office I spent my early professional years. . . . And last but not least, Dr. C. Edmund Kells of New Orleans, one of the greatest Southern dentists, and a martyr to his profession.

To have seen the advent of gold casting and conductive anesthesia during the second decade of this century, and the catapulting progress which has been made in all branches of our profession, is but to look and marvel at the realities of modern dentistry. To have attended the Dental Centenary Celebration in Baltimore in March of 1940 and to have stood on the spot where one hundred years before the founding of the Baltimore College of Dental Surgery marked the opening of the first Dental College in America was a rare and treasured

privilege. To have watched that impressive play, *The Cavalcade of Dentistry,* produced by the dramatic societies of the city of Baltimore, and to have seen the various periods in dentistry so accurately depicted was indeed an inspiration. When one thinks of the advancement made by medicine and dentistry and what those two fine professions have to offer in the form of human service, it is to swell with pride, renew one's ambitions, and be grateful for the opportunity of laboring in their fields.

In addressing our thoughts more directly to the realities of orthodontics, let us review the situation as we see it, and endeavor therefrom to summarize some of the facts which may take on sufficient working form as to produce the embodiment of the policies which should guide us into tomorrow. When this subject was first presented to me I was considerably intrigued. At first I said to myself, "this will be easy," but the more I meditated the scope of this picture, the more did it take on such broad proportions that I have been, and still am, largely bewildered by the number of elements which have contributed and enter into the realities of orthodontics today.

Prior to 1900 there is a long line of history which includes the names of many brilliant men who worked more as individual geniuses, but whose influence was largely destined to remain permanently in the foundation upon which the structure of orthodontics as a specialty was to be built. It remained for Dr. Edward H. Angle to be the first man to announce his exclusive specialization in this branch of dentistry. By 1901 he had gathered a group of thinkers about him and had organized the first class in the original Angle School of Orthodontia, which continued to thrive through one decade until 1911. One marvels at Dr. Angle, the man, for his vision in gathering around him students of such remarkable character and ability. These were the men who became the true pioneers of this newborn specialty, who became the stars in that early firmament, and who will ever remain veritably the planets of our constellation throughout the enduring years of time. It has been the privilege of some of us to have known all of them. We are more than thankful that many of them are still hale and active in our midst. There is no homage, no hall of fame which the achievements of our profession will ever make in which their labors and contributions shall not be fully enshrined.

During that first decade after the turn of the century several brilliant minds were working, and such men as Calvin S. Case and Victor Hugo Jackson, together with others, also made important contributions. Subsequent to that period, through 1911 to 1921, younger men matured to bring their experiences and observations into the field. Revolutionary changes occurred—progress continued to march onward. From 1921 to 1931 the faces of new leaders again appeared, and the fruits of their labors were added to our storehouse of knowledge. The period since 1931 has produced the results of deeper research and study, until orthodontics now has beneath it a groundwork which is solid and firm. When properly approached and practiced it can be a real service in the improvement of physical standards, and a strengthening element against the natural physical enemies of life.

While there were different schools of thought existing at the time, it remained as previously stated for Dr. E. H. Angle to establish the first postgradu-

ate school in orthodontics in 1901. This school continued to operate under its original plan until 1911. Up to this time the appliances used and taught by Dr. Angle embraced mostly the principles of the "E" alignment arch with its auxiliary parts. Following this came his "ribbon arch," and the "pin and tube" appliances. Later, and in keeping with the rapid expansion taking place in the general field of orthodontics, Dr. Angle produced the edgewise mechanism. His work and teaching were continued until the time of his death.

In 1912 the Dewey School of Orthodontia was organized, and during this same period the International School of Orthodontia and other sources of special training were available. These were all short-term courses from six to ten weeks, and if not commercial in their purposes were empirical in their nature. Any reference to these schools would be ruefully unjust on the part of anyone who might wish to use them in defense of similar schools today. These schools, particularly the Angle School, represented the beginning out of which the future educational and training programs had to evolve. It must be fully realized that in these early schools orthodontic education went through a certain processing period which emphasized the scope of expanding needs.

In the latter part of the second decade and in the early twenties, dental departments of universities began to recognize orthodontics as a subject requiring graduate and extension teaching. At present there are some fourteen dental departments of universities throughout the United States which offer courses of from one to two years' duration. Many of these universities also offer shorter postgraduate and "refresher" courses for the benefit and progress of men already within the specialty. These universities have naturally become the established centers for research in those scientific subjects upon which the continued development of orthodontics is vitally dependent. It is upon such institutions as these which possess the necessary facilities for research in the biologic and other relevant sciences that we are dependent for the solution of many of our present problems. Without this research in every branch of the fundamental sciences which sustain the vital spark in the human organism, no diagnosis and no treatment planning can be effective by incompetent operators, except perhaps by the chance of accident rather than skill.

While there are still differences of opinion and the problem of undergraduate orthodontic instruction has not been fully solved, some facts associated with it are rapidly bringing out definite conclusions. The present curricular period of established dental college training can devote only a certain proportional amount of time or degree of emphasis to orthodontics. The possibility of reorganizing undergraduate work in order to give special emphasis to such fields as operative dentistry, oral surgery, restorative dentistry, or orthodontics may just be dawning over the horizon, but it has not yet become an established reality. These colleges which offer graduate courses in orthodontics are yearly gaining experience which will have a useful bearing on the future. Changes are going to be slow. Time and patience will be required. But one thing is certain: progress cannot be made by lowering standards. The present situation cannot be made an excuse for short-term commercial courses: there is no short cut to real knowledge.

Some states have already enacted laws requiring licensure for the exclusive practice of orthodontics as a protection to the public. Other states have enacted

laws making short-term commercial courses illegal. These problems will have to be carried over into the economic and social complexities of the future. One of the most important of our realities today is the fact that properly directed undergraduate teaching and postgraduate training present problems which we must continue to analyze and improve.

Those of us who have practiced orthodontics during the past four decades are in a position to look back on many experiences and memories. Those among us who have had shorter careers have had to learn from the experiences of our predecessors. While progress has been dependent upon many practical elements, such as the use of roentgenology in diagnosis, different methods of facial and dental measurements, various types and qualities of materials, as well as other operative and laboratory techniques; these are dependent in turn upon the revelations which come to us through the many fields of related research.

A comprehensive understanding of the human organism through the medium of biology and kindred sciences is the indispensable background through which the orthodontic problem must be approached. It is through studies of the laws of inheritance, environment, nutrition, growth, psychologic phenomena, and other subjects that we have gained so much to add to the useful and practical working knowledge of orthodontic principles. We owe much to those patient and tireless research workers who have made invaluable contributions, particularly in the range of types and variations in growth studies.

Applied therapy cannot be successfully conducted without an adequate study of every individual patient in an attempt to discover all the facts which may influence the orthodontic problem. If it is an accepted fact that upon the day a baby is born there is already established within the organism all of the inherent elements which will produce the appearance of that individual at the time full growth is attained, then it is only possible to modify those hidden secrets by means of external interference. It has been stated that a large percentage of human beings fail to attain the full degree of their inherent possibilities due to the interference of outside agencies encountered during growth. Due to the complexities of racial mixtures most individuals must be content with mouths which are useful in function, preserved in health, and reasonably attractive in appearance.

That we should be content to ascribe any imperfect condition to incorrectable limitations would be falling far short of any reasonable ideal. At the same time, in the broader sense of thought, it must be admitted that under certain conditions there must be limitations; and to a better degree than now exists, they must be recognized, not to lower standards, but in order to deal more effectively with them.

It is my belief that there are many objectionable conditions about the dental and facial structures which are associated with the postural arrangement of the entire skeletal frame. There are other conditions which are associated with the face and head alone; some are only dental in nature. There are still others which are associated with some physical deficiency which is beyond dental in origin, but which must be apprehended and taken into consideration if treatment is to be successful. Such factors must be included or eliminated in successful treatment planning if desired results are to be accomplished. These are some of the elements that add to the infinitude of things orthodontic.

It is only after the general physical condition and the specific irregularities of the dentition have been thoroughly analyzed that the mechanical phase of treatment should be considered. In the present-day application of these realities there is a wide divergence of opinion and practice. The reason for this can be traced back to the different schools of thought and to the practice of certain dogmatic procedures which seem to have little logical foundation. If some disturbing local condition can be relieved or a functional impairment corrected between the ages of 7 and 9 years, I would like to see proof that this is not a rational procedure. On the other hand, if a state of malocclusion which shows no traumatic or functional involvement can be kept under observation until a later period, when a minimum of interference will bring satisfactory results, who then can gainsay that this is not the correct practice?

In the beginning of things orthodontic, the entire approach was mechanical in nature. The appliance was the first consideration. Now it has become, or certainly should be, the last part of a case to be considered. While remarkable evolutionary progress has been made in appliance design, it has been guided largely through the more fundamental progress in biologic and morphologic studies.

Frequently not sufficient time is given to a local study of the individual mouth and face, as well as the general study of the individual as a whole before treatment is begun. There has always been and still is a marked difference of opinion as to the proper time for treatment in any given case of malocclusion. A sound principle to follow in treatment planning is to set as an objective the accomplishment of the greatest amount of *permanent* benefit with a minimum of time and effort. It is my belief that there is no specific age for the treatment of all conditions of malocclusion. There may be preferable age periods for specific conditions, and there are certain years when the rapidity of facial growth produces a more effective response than others. If an infant prior to the eruption of the first permanent molars has a state of mesioclusion of sufficient extent to interfere seriously with function and the development of the facial bones, I cannot comprehend how anyone would stand by and for some arbitrary reason wait to see that condition grow worse. There is also a period between the *physiologic* ages of 7 and 9 years when some forms of corrective work may be advisable. If, for instance, a state of malocclusion is severely worse than an average of its type, it is my belief that corrective measures during this period have a twofold value: first, to prevent conditions from growing worse, and second, to guide subsequent growth trends toward normal. Treatment between these ages generally has to be suspended during the loss of the intermediate deciduous teeth, and may be resumed if necessary after the eruption of the permanent dentition. In my own experience this "interrupted" plan of treatment has brought many salient and happy results, and has reduced the manual effort to a minimum. We all know that rapid growth changes take place in facial structures in certain accelerated spurts during the "teen" years. As facial growth nears completion the volume of tooth substance approaches a more harmonious relationship with the investing tissues. It is an axiom of one of our foremost thinkers that if he had but one year to work for a girl whose growth was on a parity with her age, he would select the fifteenth year. This again brings up the theme of accom-

plishing the greatest amount of benefit within a minimum of time. By some such open-minded and flexible rule as this, the harmful elements of long or unnecessary treatment may be almost entirely avoided.

In 1900 there were many forms of appliances in use, but the three principal systems were those of Drs. Edward H. Angle and Calvin S. Case representing fixed appliances, and that of Victor Hugo Jackson representing removable appliances. These were supplemented by textbooks, each dealing with the respective superior qualities of their method. There were numerous other appliances in existence representing in a similar way the ingenuity of their designers. Appliances were made of base metals and both in volume and quality of materials exercised mechanically and chemically a severe handicap on the physical condition of the teeth and oral tissues. Fixed appliances represented stability of anchorage with intermittent control of pressure. Removable appliances possessed something more constant in the nature of spring pressure, but this was offset by an instability of anchorage. It cannot be denied that all of these appliances were useful steps in the evolution of the modern appliances in use today.

It was a frequent practice in the early days to start a case by creating the necessary development with a Jackson appliance, then to use an Angle appliance for the final alignment and equalizing the occlusion. While some of these brought satisfactory results, no case could ever attain a degree of success beyond the limitations of the appliance used. Eventually it became apparent that further advancement in appliance design would have to be accomplished by the elimination as far as possible of the objectionable features of both the fixed and removable types. Stability of anchorage and constant gentle stimulus were then recognized as the two most essential requirements for any appliance.

Working on this premise, Dr. John V. Mershon developed lingual and labial arches which could be locked into position and removed by the operator for the adjustment of flexible and delicate auxiliary attachments. Behind these designs of appliances, Dr. Mershon implanted the theme of growth and development, and the fact that any mechanical interference should be sufficiently flexible as to adapt its work to the growth processes going on in the structures around the teeth.

This brought about a sweeping change in materials, with the use of hard and springier gold-platinum alloys, lighter in weight, and more compatible to the oral tissues. During the early twenties orthodontic progress was confronted with serious problems regarding the physical properties of the metals which these new appliance designs required. For this it was necessary to institute sufficient research and experimentation to produce metals fulfilling all the necessary physical requirements for different types of appliances. This was a remarkable step forward, as attested by the high degree of perfection in our present orthodontic materials.

In addition to the Mershon lingual and labial appliances with their auxiliary attachments, there has also been a decided improvement in the designs of appliances employing multiple or total banding of teeth. Notable among these are the Angle edgewise mechanism, the Atkinson universal attachment, the McCoy split tube, and the Johnson twin-wire mechanism. Chrome nickel alloy

has become definitely established as a useful and effective material, and the technique necessary for its manipulation has also exercised an influence on appliance design. So far as the realities of mechanical resources go, the profession is well invested with an armament of materials and principles, no one of which is necessarily the universal one, and no one of which is more useful or effective than the skill with which it is applied in the hands of the individual operator.

The attitude of the dental profession is divided on the subject of the practice of orthodontics as an exclusive specialty. It is safe to say that the majority of busy dentists will frankly admit that they either have no interest in the practice of orthodontics or that they know so little about it that they are afraid to fool with it. This likewise pertains to other branches of dentistry which require more than an average amount of knowledge and skill for their successful practice. A certain percentage of general dentists, however, in the honesty of their convictions I hope, or through the medium of persuasion, are opposed to the exclusive practice of orthodontics. The difference between the legal right to practice orthodontics and the moral right to practice it is the difference between the dental license which permits it legally and the moral aspect which can only be governed by the extent to which any individual dentist through training and experience becomes competent to perform certain orthodontic operations. It is nevertheless an indisputable fact that no dentist or orthodontist can accomplish any more results in an individual case than his capabilities permit. If he is 10 per cent, 30 per cent, 50 per cent, or 70 per cent an orthodontist, he is just that much and no more, and cannot lay claim to practice successfully beyond his own limitations. It is safe to say that the exclusive practitioners in orthodontics who have prepared themselves possess less prejudice against the attitude of general dentistry than the prejudice which some of the general dentists manifest toward the specialty. The only demand which the specialist makes of the general dentist is that he should render himself proficient to the degree in which he would conduct orthodontic treatment, to the extent that if he became sufficiently skilled he would in turn doubtlessly specialize himself. It is only for the protection of orthodontics as a branch of dentistry and the public to which its services are directed that the specialty makes any request of the general practitioner.

We as orthodontists should maintain a most sympathetic and appreciative attitude toward the public we serve. There is no phase of any of the healing arts which is not dedicated and devoted to the service of the human aberrations and insufficiencies which come within its scope. Personal pride, high ideals, lofty ambitions cannot be realized without protecting in every way the essence of public interest and welfare. To be able to render a maximum improvement to the greatest number within one's capacity to serve, and to feel at the same time that the attending parental interests are being protected at least, begins to approach an ideal standard which should be the eternal guiding element of every doctor.

It is a fact that concurrent orthodontic practice is attended with certain expense. The materials involved and the accumulated hours of direct and indirect time spent for a patient over varying periods necessarily have to be ac-

counted for. If these elements of cost can be reasonably computed over a period of one or two years, then a fair insight may be gained into the economic aspect of treatment. It has always been my feeling that no transaction was fair which was not mutually fair to all parties concerned, and this is applicable to the present economic procedures affecting orthodontic practice.

I have heard it argued that if the higher levels of orthodontic ideals were pulled downward so as to spread the substance over a greater area of usefulness, this would make for more practical though less perfect results. To this I would not subscribe and would have no part thereof. First our problem is to do the greatest amount of good, and after that comes another problem as to how it can be done for the greatest number. The public have been patient through these forty years of specialization in orthodontics wherein they have had to accept the good and bad alike through changing theories and methods. In some places their faith has been weakened by unfortunate experiences, but the growth of the specialty proves that it has not been destroyed. It is our duty to recognize these facts and do everything within our power to justify their confidence.

It is my opinion that orthodontics is facing an uncertain future in the next several years due to the socio-economic status of a world wrought with chaos. To the extent that we as individuals fail to recognize the facts involved and fail to cooperate with the public, then to a similar degree will we as individuals and a specialty suffer. Inasmuch as the large majority of orthodontic cases are elective in nature, there will be many devoted parents who though desirous of giving their children these physical benefits will be obliged to defer treatment indefinitely. In considering this possibility we may find it necessary to make some revisions in the practical and financial aspects of our work, but not in our principles and ideals. The dislocations which we must expect are going to hit hard in spots, but I still feel that with the confidence and faith of those we serve we should be able to readjust ourselves in such a way as to apply kindness and consideration where they are deserved. In doing this we will weather the conflict and survive it with flying colors.

With the distortions of a war-torn world, orthodontics will be forced to cope with new and changing problems. There are many of our members who could be of genuine service to our armed forces. It may be necessary for some of them to go into active duty without choice. They should be encouraged and supported in every way, and it should be the patriotic duty of every one of us to guard and protect the interests of these men whenever and wherever necessary. Many orthodontic principles have a definite place in the treatment of traumatic injuries of the face and jaws. While an orthodontist is not absolutely essential on a maxillofacial team, his special training is peculiarly adaptable to this type of work. The orthodontist will have to undergo a complete state of conversion and become more strictly a maxillofacial orthopedist. Instead of moving teeth or changing occlusions it will be necessary to effect the mass movement of large segments of bone and to stabilize them in position. For this, security of anchorage is paramount and upon it depends the success of the case. This requires the highest skill in doing the finest of wiring operations as well as the selection of the best adapted designs of splints. Anchorage principles and a

few cardinal principles of splint design can best be interpreted by the orthodontist, although as stated before he is not absolutely vital since men trained in prosthodontics and other branches of dentistry may also become very proficient in this type of work. The orthodontist should also be trained to handle the daily treatment and dressing of wounds, particularly through the septic stages. He should be versed in chemotherapy, be able to perform minor operations, and be of real assistance to dental and oral surgeons. In a like manner he should be of great assistance in the prosthetic work both at the chair as well as in the laboratory where all kinds of splints and prosthesis are being made. This is no place for some of our prima-donna brethren who think that originality and genius begin and end within themselves. It is a place for earnest men who will be willing to learn the standard principles of the Army and Navy and apply them as faithfully as they can.

It has been interesting to review some of the realities of orthodontics as they have transpired and to note their influence on the status of things orthodontic today. In order to do this, it has been necessary to divide them into various component parts and follow them individually back toward their beginnings. In retracing our steps it can be seen that orthodontics in all of its parts as well as the whole is the result of a gradual but steady process of evolution. Progress in most departments has been achieved through trial and error, elimination, addition, and combination of principles. As we reassemble some of these elements into the substance matter of the science and practice of today, we may perhaps gain sufficient insight into the future as to note the general direction in which these trends are leading.

Obviously the question of undergraduate orthodontic instruction needs further attention. Investigation of the records will show however that a great deal of thought and study have been given to it, and undoubtedly differences of opinion are steadily converging toward a solution. Until undergraduate courses can be lengthened, it is obvious that only a certain amount of time can be allotted and apparently but a limited amount of interest anticipated. It must be generally agreed however that the dental student upon graduation should have sufficient clarity of vision into the orthodontic phase of dental problems as to be able to recognize or detect difficulties in sufficient time to direct their correction, or, even under certain conditions, to prevent their occurrence.

The American Association of Dental Schools is in session in New York during this week. The Orthodontic Section is now meeting to further this study. Dr. Leuman M. Waugh, chairman of the section, Dr. B. E. Lischer, Dr. George R. Moore, and other teachers among our membership are thus prevented from being present on account of these conflicting dates.

As we older men have watched the theoretical, scientific, and practical aspects of orthodontics expand far beyond early bounds, we have come to realize the seriousness of adequate preparation. I do not believe that the current graduate courses in orthodontics offered by university dental schools place too much emphasis on any of the subjects taught. In some of these courses one principle may be preferred over another, but they seem to be agreeably uniform as to the length of time necessary to cover the requisite work. Short-term courses, even if conducted under ideal conditions, would be smothered by the material which is vital to be taught. Any facilities short of university capacity

are decidedly inadequate. Regardless of the motives set forth by exponents of short-term courses, commercial or otherwise, it is obvious that they cannot possibly provide the deeper and broader perspectives of knowledge which are essential. It is to the universities that we must also look for the continuation of the work in research which is so invaluable in the development of adequate knowledge and its rational application.

An important present-day reality lies in the materials and designs which constitute the appliances and the methods of treatment of this period. There are some principles in regard to appliances which are generally recognized by all schools of thought. These include security of anchorage, hygienic protection, and sufficient flexibility as to cause but little temporary and no permanent damage to any of the structures. Whether one selects the so-called lingual and labial arches with their auxiliary attachments, or whether one elects to enter the field of multi-banded appliances, these are matters of preference and choice. It is not important to discuss at length the relative merits of any individual appliance or appliance principle at this time—suffice it to say that there seems to be no universal appliance in the usual sense of that word, and I would question whether such an appliance could or should exist. I recently heard one of our foremost thinkers state that it was not the appliance which achieved a certain result that interested him as much as the *satisfactory and permanent conclusion of the work at hand.* The fine wires and gentle springs used in the appliances of today are most consoling and seem destined to have a definite bearing on the principles of the appliances of the future.

It is my belief that an outstanding spot in orthodontic procedures is the place where diagnosis ends and treatment planning begins. This perhaps may be argued as one of the most vulnerable spots in orthodontics today. Diagnosis means the collection of every subjective fact and symptom which would be helpful in revealing the positive truth of any condition at hand. Treatment planning follows the summing up of these facts, when the proper time, kind, and amount of interference can be determined. Treatment then becomes the objective element, and it is then at the juncture of the subjective and objective where the plans thus evolved must be right or wrong. To cite an example . . . what of planning to increase the buccal width of a dental arch in order to gain anterior space when the posterior teeth should be moved distally? Or what of attempting to bring the entire mandible forward beyond its limits in an attempt to occlude it with a protracted maxillary arch? Or what of attempting to bring an entire mandible forward when the lower denture and alveolar attachment are retracted on the mandibular rim? For all the forcible attempts that it is possible to apply, such mistakes as these are obliged to result in dismal failure. Dangers of this kind are one reason why commercially designed appliances are a menace to public welfare. No doubt in time laws will become necessary for the regulation of laboratory-constructed appliances, short-term commercial courses, and the licensure of orthodontists in exclusive practice. For the elevation of this branch of dentistry to its proper position and for the protection of the public, these legal controls must eventually come. This is no time for complacency on the part of any of us, and wherein we need to be strengthened and improved, it is to those ends we must concentrate our efforts.

ROOT RESORPTION

Dr. Samuel Fastlicht, Mexico, D. F., Mexico

MANY are the authors who have devoted attention to the study of root resorption; and several are the theories offered in explanation of this condition, such as the pressure atrophy, the inflammatory process, traumatism, dietary deficiencies, as well as the glandular theory.

We shall not enter into detail concerning the interesting experimental studies carried on with animals (monkeys and dogs), by Sanstedt, Oppenheim, Gottlieb & Orban and many others, but we shall mention, however, names of men who have studied resorption in man, such as Oppenheim, Kogure, Gubler, Grubrich, Herzberg, Stuteville, and others. It is well known that human cementum is vulnerable under the pressure produced by any orthodontic appliance, and that the important statements of Oppenheim, based on an abundance of human material, show that in every tooth movement resorption of root cementum and even pulp alterations can take place, as confirmed by Kogure, Oppenheim states textually: "The smallest excess beyond the physiologic pressure-condition in the periodontal space is bound to result, as a consequence, in the appearance of cementum resorptions."

Fortunately we know that the resorbed areas of the roots are almost always filled out by secondary cementum (Oppenheim). Also Kogure studied the pulp alterations during the orthodontic treatment, as well as root resorption in human beings (eight patients), and he reached the conclusion "that the various orthodontic processes that were used in the orthodontic clinic demonstrated certain pathologic changes in the dental tissues, these being without consequence in the vital function of the teeth." He observed resorptions in the pressure area of the root, especially at the gingival margin of the tooth, and after sixty days of retention he was able to observe new deposits of secondary cementum in the resorption areas.

Kronfeld also holds the opinion that, "The most important fact in connection with this type of root resorption is that the resorbed areas are repaired by deposition of secondary cementum as soon as the pressure is ceased."

It would be convenient to divide resorption into three classifications: internal, lateral, and apical.

Internal Resorption.—The internal root resorption starts usually in the pulp chamber and widens the root canal, but it may also start from without. The pulp is transformed into a vascular granulation tissue and, according to Thoma, osteoclastic activity has been observed in the resorpted pulp canal. The etiology of this idiopathic resorption is unknown.

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Kronfeld considers the internal root resorption as a chronic perforating hyperplasia of the pulp or internal granuloma. He found two possibilities: "either the resorption originating from the pulp begins inside of the tooth and progresses from the pulp cavity outward or it originates in the periodontal membrane and invades the pulp chamber from outside."

CASE 1.—We would like to present a case of internal resorption, where only the so-called "pink spot" was noticed. The patient did not complain of any pain, and the pulp tester revealed normal vitality. It is the case of a young lady, 17 years of age. The x-rays showed a considerable resorption that probably began in the pulp chamber, removing completely the dentine of the crown. The tooth was left as thin as a shell. After the extraction, it was observed that the whole space was filled out with granulation tissue. With much difficulty it was possible to observe a small channel at the level of the gingival margin. The pulp was withdrawing into the root canal, and it remained almost isolated from the original cavity by a layer of protective dentine, and it was possible to observe the extremely narrow canal joining the resorbed cavity. The internal walls had a smooth appearance and were light in color (Fig. 1).

Fig. 1, Case 1.—Left lateral incisor with the internal resorption, noticed only by the so-called "pink spot." (Courtesy of Dr. Fernando Todd, Mexico City.)

Lateral Root Resorption.—From the outset we must differentiate between the cement resorption and apical resorption. The lateral resorption of the root takes place frequently during the orthodontic treatment and cannot be easily noticed by the x-ray; we have knowledge of it from observations based on experiments, as well as after extractions. Oppenheim in his important work, "Biologic Orthodontic Therapy and Reality," reproduces plaster casts of the resorptions that he has found.

Apical Resorption.—Ketcham's x-ray statistics taken from his interesting findings aroused the orthodontic world on account of the alarming results that he observed. Ketcham attributed to certain appliances the cause of the high percentage of cases of apical resorption.

And as an immediate result, the most delicate forces have been used in connection with our orthodontic appliances.

A. M. Schwartz studied, as is well known, the degree and application of forces in accordance with biologic principles, taking as a basis the blood pressure of capillaries, which is 20 grams per cm.^{2}, and on this fact he established 4

degrees for the application of force in orthodontics, reaching the conclusion that mobilization must not be in excess of 1 mm. per month.

The one who really contributed some light toward the partial solution of the problem, from the medical viewpoint, was Dr. Hermann Becks. From his interesting investigations one may conclude that root resorption is due principally to glandular deficiencies and especially to hypothyroidism. On examination of the first 100 patients affected with root resorption, he showed that 60 per cent had undergone orthodontic treatment and that the remaining 40 per cent showed root resorption without having been submitted to any orthodontic treatment; on the other hand, he observed in these patients a great number of disturbances of the endocrine system.

According to Becks, hypothyroidism shows the highest frequency in root resorption. Other forms of endocrine dysfunction were also observed. Becks thinks that the mechanical pressure accelerates the resorptive forces. He is also of the opinion that root resorption is rather the result of individual predisposition to increase resorptive activity. This agrees with Kronfeld's opinion, that "Orthodontic treatment apparently acted as the contributing factor but could not be considered the primary cause. No definite correlation could be established between root resorptions and the type of orthodontic treatment or appliances."

Rudolf, quoted by Thoma, studied the problem of root resorption. He was interested in determining at what age apical resorptions took place more frequently, that is, among adults or among children whose apical foramen has not yet closed. In 439 orthodontic patients he found that in the first year 48.74 per cent showed root resorption, and that in the second year this percentage increased to 74.63 per cent. He drew the conclusion that the gentle force applied to teeth with incomplete root formation does little harm, while vigorous treatment at a later age, when the foramen is complete, may produce resorption process.

The idea that orthodontic treatment produces less resorption prior to the closing of the apical foramen agrees with C. R. Baker's opinion; he states: "It is sound judgment to apply corrective treatment before the root development is completed."

In this connection, Orban states that he had never observed in young people the fracture of the thin walls of root cementum prior to the closing of the apical foramen, even when great forces are applied in orthodontics.

On the other hand, Oppenheim is of the opinion that orthodontic treatment should not start before the development of the root apex, for according to him: "An x-ray status before the start of the treatment is an obligatory demand, not only on account of the question of root resorption, but also that we may ascertain how far the root formation has been accomplished. The negative ascertainment demands postponement of treatment."

Although in this paper we do not pretend to solve this problem, we must recognize that the proper age for orthodontic treatment is precisely that of the child at the time of development and formation of dental roots. It is at this time of life that the apical foramen is about to close, but rarely is it completely developed in the teeth that the orthodontist mobilizes.

Idiopathic Root Resorption.—The problem of idiopathic root resorption is more serious on account of its unknown etiology and consequently its treatment is empirical or null, although Carman published a case report of a successful treatment, after the patient had been submitted to medical treatment, when it was observed that the roots had begun to be resorbed. The x-rays presented by the writer himself show that the four front teeth remained, but without a considerable part of their roots. This leads us to think that resorption would have taken place perhaps without the orthodontic treatment, and that medical treatment did not stop the resorption.

Case 2.—In this paper we wish to present a case of complete root resorption in some teeth, a case where the patient has never been submitted to orthodontic treatment, nor showed traumatic occlusion, nor any local inflammatory process, nor any organic disease, nor any endocrine dysfunction. It is the case of a girl 13 years of age who came to our office with a left maxillary lateral incisor in torsion and in a state of excessive mobility, to the point that the tooth fell out a few days after the first x-ray was taken (July 9, 1940) (Fig. 2).

Fig. 2, Case 2.—Considerable root resorption; girl, 13 years of age, has never been submitted to orthodontic treatment. X-rays taken July 9, 1940.

After a detailed medical as well as dental examination, it was not possible to find the apparent cause of this resorption, and the parents, alarmed by the fatal consequences that might occur in their daughter's mouth, took her from Mexico to The Mayo Clinic, from whose report we quote: "We found her to be somewhat under the average for her height and age; her blood pressure was 116/68, pulse 88, and temperature normal; the eyes were entirely normal; there was no evidence of any infection in the nose and throat; the urine tests showed no albumin and no red cells; the hemoglobin was 11.9 grams per cent and leucocytes 9000; the flocculation test was negative for syphilis; the x-ray of the chest was negative; the blood calcium was 9.8 mg.; present phosphorus 5.3 per cent and phosphates 4.7 units per 100 c.c.; tuberculosis test was negative. There were a few pus cells found in the stools but no parasites or ova were present. Her basal metabolic rate was minus 8." (Fig. 3.)

From the dental section of the same clinic we have the following report: "Both of the upper lateral incisors have been undergoing very active resorption with the result that the one on the left has been lost and the one on the right is also about to exfoliate. The cause of this type of resorption is unknown. All

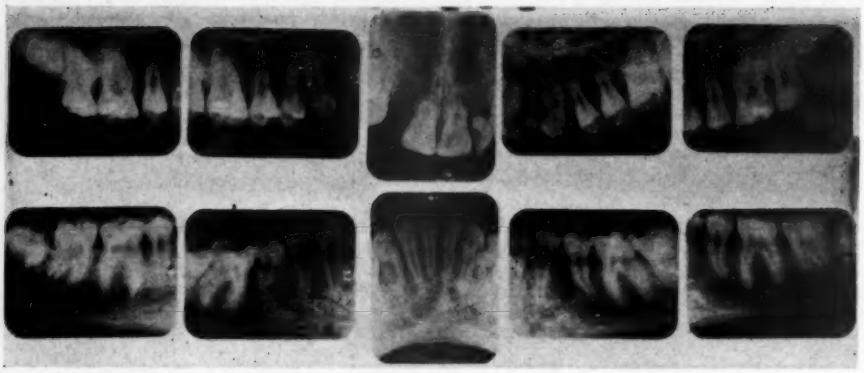

Fig. 3.—X-rays of the patient, Case 2, Oct. 9, 1940.

Fig. 4, Case 2.—Recent picture of the front teeth.

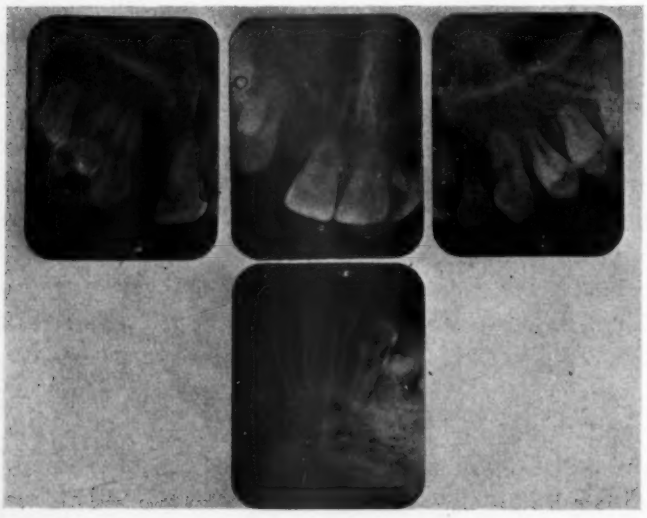

Fig. 5.—X-rays of the same patient, Case 2, Feb. 2, 1942.

the teeth, both upper and lower anterior to the first molars, have roots that have not fully developed. There is, however, no evidence of the type of active resorption that has taken place in the upper lateral incisors. Such resorption probably will not occur in these teeth, but that is not certain. All of the second and third molars are now developing normally and the only teeth which have become carious are the six-year molars."

There was no treatment suggested, "except the use of small doses of thyroid empirically, one-half grain daily."

The patient up to this time has not lost another tooth, and the right lateral is still stable, as well as the other teeth. The bone through osteoblastic function has deposited new hard tissue in the resorbed areas. The reaction of the pulp tester reveals normal vitality. The color of the teeth does not suggest their abnormal condition. The last x-rays were taken Feb. 2, 1942, together with the photograph that shows normal occlusion (Figs. 4 and 5).

CONCLUSIONS

1. The internal resorption takes place within the pulp cavity with the tendency to widen and is capable of destroying a large internal part of the crown and of the root of the tooth; it is of idiopathic type and its origin is unknown.

2. The lateral root resorptions, produced by pressure of the appliances during orthodontic treatment, are filled out with secondary cementum as soon as the pressure is removed.

3. The dysfunction of the endocrine glands and especially of hypothyroidism may produce root resorptions in individuals who have never been subjected to orthodontic treatment.

4. Idiopathic root resorption sometimes destroys the roots completely and on account of its unknown etiology no adequate therapeutics can be applied.

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A CONSIDERATION OF THE IMPACTED AND UNERUPTED THIRD MOLAR

Indications and Contraindications for Its Removal, and Suggestions Regarding Its Importance to the Oral Surgeon and to the Orthodontist

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THE most interesting and most discussed of teeth possessed by man is undoubtedly the third molar. The numbers of papers discussed and clinics given on this subject have been uncountable. It would seem that dentists are constantly considering either the question of extracting this tooth or the question of preserving it. Once more the specter of the boon and bane of both the orthodontist and the oral surgeon, the impacted third molar, is resurrected in this paper, a short treatise which will attempt a reconsideration of the impacted and unerupted third molar, indications and contraindications for its removal, and suggestions regarding its importance to the oral surgeon and to the orthodontist.

Unfortunately, in the great majority of cases, the impacted third molar teeth are brought to our attention as accomplished facts. The third molar is in the majority of cases already impacted when the oral surgeon is called for consultation regarding its surgical removal. The third molar is too frequently impacted when the orthodontist thinks it necessary, in order to insure the success of his treatment, to request the assistance of the oral surgeon. There is no question that the cure for the impacted third molar is simple—its extraction or surgical removal. Of course, such treatment is not as radical or as extensive as decapitation for the control of headaches; nevertheless, the problem of the third molar, one of the most commonplace problems in the practice of dentistry, is one worthy of deeper study and *closer* cooperation, in an effort to understand more fully its etiology, implications, complications, and possible prevention. In these respects the impacted third molar constitutes, at present, an unsolved problem, an unpleasant obstacle to the orthodontist, the general practitioner, the patient, and a constant problem to the oral surgeon.

A study of the literature regarding the impacted third molar indicates a great deal of confusion and little unanimity of thought on the subject. Material published on the surgical considerations of the third molar, including the more modern methods of moving pictures, in so far as we have been able to observe, deals exclusively with variations of technique for its surgical removal, and the treatment of postoperative sequelae. This is well exemplified in Dr. George Winter's admirable work on the third molar. His great contributions to the classification of the types of impactions, radiographic diagnosis, and

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surgical technique of removal are as yet unsurpassed; yet his book, perhaps sensibly so, gives no illumination to the subject of etiology or prevention.

Thoughtful men have long been cognizant of the implications presented by this problem. Their words, to a great extent, have been lost in the great deluge of controversial, contemporary literature. W. Kelsey Fry, writing on the third molar in the *British Dental Journal*, April, 1933, states: "Nowadays, when children are placed in the hands of a dentist for advice and attention regarding their teeth, surely it is his duty to take care, not only of the immediate needs, but also to consider the probable future condition. Can it be said that this duty has been well performed if it should be necessary for the patients, on reaching a more mature age, to undergo a complicated and difficult surgical operation for the removal of impacted wisdom teeth?"

Dr. Horace Davis, in the May, 1932, issue of the *Journal of the American Dental Association*, on the same subject, observed: "To find at the adult stage of life that impacted teeth are present and must be removed under adverse conditions is an indictment of our previous attention to these patients."

Both of these men were impressed with the problem of prevention of the impacted third molar. Both advocated the extraction of teeth in early life as a preventive measure. However, Fry advocated the routine extraction of the six-year molar as a prophylactic measure, while Davis advocated individual consideration based upon anatomic and orthodontic study. One of the most thoughtful statements on the problem was made by Dr. George M. Anderson of Baltimore, in a commentary on the previously mentioned articles which was published in the *British Dental Journal* of September, 1933.

Dr. Anderson said, in part: "[Fry and Davis] carry the same basic message, that the dentist and the orthodontist must acquaint himself early in the life of his patient with the future trouble-making areas and utilize all available aids to minimize at least, or eliminate entirely, the damaging effects of the third molars. Fry and Davis are at variance, however, in the intent of their remarks concerning the removal of the second molar as an aid to the eruption of the third molars. The former states that 'to allow the third molars to erupt in severe cases of impaction in later life the removal of the second molar is necessarily a gamble.' He is right. It is not so much a gamble, however, if done as Davis implies, in the early years when first indications of severe impactions become evident. Extracting second molars in later life as an aid to eruption of the third molars is worse than a gamble. The odds are against it anatomically, for the third molar invariably has been displaced from its normal line of eruption and therefore can be of little functional use if it should erupt. In addition, the apical end of the root is often distorted, some of the twists and curves being so pronounced as definitely to interfere with any tendency of eruption that may remain in the later years of life. The very fact that Davis advocates the early study of the third molars indicates that he is well aware of the possibilities and by the use of the x-ray hopes to decide at a sufficiently early age just what course is the better to pursue for the patient.

"Fry's advocacy of the extraction of the first permanent molar should be condemned. The late Martin Dewey has given full and sufficient reasons against this practice, not the least of which is the question of the creation of a very

deep overbite, and the disgusting tendency of the lower bicuspids to drift distally, leaving annoying spaces between these teeth and those anterior to them. If, as the former states, a great majority of cases of impaction are due to a 'want of space' for eruption, does this not then indicate that more careful study should have been given to the causes that brought about the 'want of space'? Possibly through the use of an orthodontic appliance over a period of years the lack of development existing early in life may be supplied, at least to a beneficial degree. It is hardly wise to suggest extractions to relieve a malocclusion when we do not know reasonably well what created the abnormal condition. I have for many years advocated extraction in the treatment of extreme cases of malocclusion, but seldom have I suggested the first permanent molars. I cannot, therefore, be classified in any sense as one of the opponents of sensible extraction as an aid in orthodontic procedure. To function properly in the masticatory act the patient needs the broad occlusal surface of the first permanent molar. Fry claims that the line of treatment involving the extraction of the second molars is definitely unsatisfactory from a masticatory point of view and clearly indicates the strong case for early preventative consideration. His early preventative consideration is built around the extraction of the first permanent molar. It hardly remains to be argued that his statement is somewhat contradictory to his teaching, for who is there who will say that the second molar is anywhere near as satisfactory a tooth in the masticatory scheme as is the first permanent molar.''

Articles in the literature on orthodontic considerations of the subject deal, in the main, with the influence of the impacted third molar upon the etiology and treatment of malocclusion, of the influence of malocclusion upon the maldevelopment and subsequent aberrant position of the third molar. The literature as a whole is inconclusive and more than a little confusion exists in the treatment of the problem from a comprehensive point of view. There is a vast opportunity for further study and data on the subject in the realms of anthropology, heredity, environment, and the trends of the evolutionary pattern.

Slight irregularities of the anterior teeth are not infrequent during eruption. These normally disappear or are corrected spontaneously as the teeth approach their normal erupted position. However, malrelationships of the maxillary and mandibular first molars rarely correct themselves, and if untreated are not infrequently followed by increasing malrelationship of the jaws with consequent malposition of the teeth which erupt subsequently. This early irregularity of the teeth with varying degrees of malocclusion is no doubt a primary indication of faulty proportions in the development of the jaws and bony arches. This may be another indication of atavism and the evolutionary pattern. Before the intermingling of races because of migrations and intermarriage, there were definite racial patterns of bony development and structure, particularly marked in the form of the facial structures. The members of the present generations are the results of countless years of racial cross-breeding. Therefore, all of us and all of our patients are members of a confused product of racial types, and the outcome of such cross-breeding could hardly be expected to result in perfectly well-balanced products. If we admit the premises of evolutionary influence, hereditary factors, and the inheritance of recessive charac-

teristics, it is not inconceivable that these influences, acting upon the developing individual, may well be causative factors in the production of unequal proportions of the teeth, jaws, and other facial structures. Gregory, in his book, *Evolution of the Human Dentition*, stated, "The third upper and lower molars are greatly delayed in eruption, especially among higher races, and are evidently decadent teeth which may eventually be entirely lost." Darwin, in *The Descent of Man*, said, "It appears as if the posterior molars, or wisdom teeth, are tending to become rudimentary in the more civilized races of man. These teeth are rather smaller than the other molars as is likewise the case in the chimpanzee and orang. They do not cut through the gum until the seventeenth year and I have been assured that they are also more liable to decay and are lost earlier than the other teeth. In the Melanesian race, on the other hand, the wisdom teeth are usually furnished with three cusps and are generally sound; they also differ less from the other molars in size than in the Caucasian races. Professor Schaffenhausen accounts for this difference between the races by the posterior dental portion of the jaws being always shortened in those who are civilized, and this shortening may be attributed to the civilized man's habitual feeding on soft food and thus using the jaws less." Although of philosophic interest, this progressive degeneration of the human jaws and dentition has not been proved clinically. Nevertheless, its importance, along with other factors of developmental biologic influence, must not be neglected.

The influence of heredity upon the faciomaxillary development is of dominant consideration. Germ cells which unite to become a developing individual contain in their genetic pattern every developmental possibility that can be realized in the adult. Regardless of what that hereditary pattern might be, the possibilities of its complete fulfillment are rare. *Environmental* factors which subsequently influence development of the original pattern must necessarily result in a *mutilation* of that pattern.

The most important environmental factors affecting faciomaxillary development and producing dysgnathic anomalies are habit, disease, and trauma. A simple nasal obstruction, such as adenoids, may predispose mouth breathing, which in turn deprives the maxillary molar teeth of the support of the mandibulars, thus permitting the cheek muscles to exert pressure against the upper teeth and jaw, limiting or inhibiting natural development. As this progresses, the palatal arch increases in height, the nasal septum becomes distorted, and the nasal fossa becomes more shallow. The dental result of this sequence is malposition of the maxillary teeth in relation to the mandibulars. Faulty position and inhibited function tend to retard the normal development of the mandible. Habits, such as thumb-sucking, exert a similar influence. Febrile diseases, malnutrition, and endocrine disturbances result in stimulated or retarded development of the paradental structures to such an extent as to be important etiologic factors effecting dental and maxillary deformities, and since the third molar is but an item in the process of faciomaxillary development, any discussion of the problem must take into consideration all influencing factors.

The adult relationship of the dental arch is not complete until full development of the bones and teeth is accomplished, and this should include the

third molars. Although they usually follow the pattern of the other faciomaxillary structures, occasionally they seem to follow a pattern of their own.

That the developmental pattern of the individual mandibular angle influences the position of the third molar, and that the third molar, of itself, influences the development of the angle is unquestioned. This related process is, of course, integral to the development of the face as a whole. As the maxilla develops and grows, the plane of the hard palate changes from a line located above the temporomandibular joint, as in infancy, to a lower level which progresses to a position best demonstrated in the edentulous skull of old age. Because of the growth of the alveolar processes and the eruption of the teeth, it becomes necessary for the body of the mandible to attain a compensating position. This is accomplished by the development of the ramus of the jaw. With the development of the ramus, the angle of the jaw is conceived. The teeth, opposed and erupting in proper sequence with concurrent bone growth, are probably among the factors which establish the normal angle of the jaw.

In many cases an abnormal mandibular angle may be a contributing cause or result of malposed third molar teeth or general malocclusion of the other teeth. During the period of adult dentition, the angle of the jaw presents an average arc of 100° plus. In extreme youth and extreme old age, the angle is of greater arc. From childhood to adolescence the angle becomes more acute as a result of bone deposition, whereas in old age the angle widens as a result of bone absorption.

At birth the body of the mandible is almost straight and almost rests against the contacting surface of the maxilla. From the eruption of the deciduous central incisors to the eruption of the third molar teeth in early adult life, there is a region posterior to the occluding teeth which, it is assumed, if unsupported by opposing teeth, absorbs the greater part of the force expended by the internal pterygoid and the masseter muscles, overaction or underaction of these muscles by direct pressure profoundly affecting the growth and development of this area of the mandible. Muscle overaction at this point, particularly when the body of the mandible is unrestrained by proper occlusion of the teeeth, permits the degree of angle to widen with consequent protrusion of the jaw. Thus it can be seen that the plastic response of the unsupported portion of the mandible posterior to the occluding teeth to the forces of muscular action is considerable during the period of osteogenesis and growth. Almost any change in the developmental pattern of this portion of the jaw is reflected in a corresponding influence upon the position of the third molar.

The position of the third molar is influenced by the same developmental pattern which results in the normal dentition within the limits of anthropologic variation. However, it is pointed out that evolutionary factors favor a retrogression of the mandible and a possible disappearance of the third molar. This shortening of the jaw is a potent influence in the etiology of the impacted third molar. However, the etiology of this condition must in many cases be one or more of the factors previously mentioned. Impacted molars may be an hereditary characteristic, or the result of habit, disease, or malposition of one or more teeth in early youth which, if uncorrected, predisposes malrelationship and imperfect development of the entire dentition, deformity of the jaws, and asym-

metry of the face; thus impairing the stimulus for the third molar to erupt in a natural occlusion, or inhibiting the development of the face to such an extent as to leave insufficient room for the third molar to erupt in a normal direction. Uncorrected malocclusion at an early age may be an important factor in the cause of impacted third molars; and it is assumed that impacted third molars at adolescence and in early adult life present a hazard to the success of orthodontic treatment.

The impacted third molar presents to the oral surgeon one problem. That problem is the removal of the tooth with the least possible surgical instrumentation and with the least possible trauma to the adjacent tissues. From the surgical viewpoint, there are at present *no* contraindications for the removal of "normal" impacted third molars. Their presence is a constant potential hazard to the patient. It is unnecessary to discuss at length the symptomatology, pathology, and possible systemic detriment of impacted third molars. Such conditions are well known. Suffice it to say that with *competent skill* the offending teeth can be removed with universal benefit to the patient.

The orthodontist, however, on many occasions in which he is certain the third molar teeth will not develop and erupt in a normal position, refers the patient to the oral surgeon at a time when the third molar is not fully developed. The unformed roots and large developmental sac and cavity surrounding the crown make it almost impossible to extract this tooth without extensive trauma to the soft tissue and removal of large portions of the bone overlying the tooth. At this stage of development, the angle of the jaw may be inhibited by the extensive bone trauma necessary to effect the removal of the tooth. It would be far better, as far as the oral surgeon is concerned, to wait until further development of the tooth has occurred. Furthermore, the observation of many cases has shown that it is impossible to predict, before the completion of adult development, whether or not an erupting third molar will be impacted or will erupt into a useful position. But since human growth has no fixed schedule, the time of this development must be considered as variable.

The orthodontist, in his consideration of whether to advise retention or extraction of the third molars, must be guided by many factors; indeed, many more than would occur to the oral surgeon. However, he would certainly include the type and extent of the malocclusion, the degree of functional impairment, the age of his patient and the prognosis of his case, whether the impacted third molars are affecting the treatment adversely, or whether they are the result of the original malocclusion.

The problems of the orthodontist and of the oral surgeon regarding the third molar are inseparable. It is true that many cases of impactions might be prevented by adequate, early orthodontic correction of the "at-the-time" simple malocclusions. It is also true that many cases of aggravated malocclusion might be aided by the timely intervention of the oral surgeon in removing impacted molars. Nevertheless, there is a great opportunity for further study of the problem by cooperating groups of orthodontists and oral surgeons and a closer recognition of their mutual problems.

The oral surgeon should acquaint himself more closely with the principles and problems of orthodontic diagnosis and treatment. The orthodontist should

realize more fully the limits of the oral surgeon in his efforts to produce the greatest benefits to his patient with a minimum of distress and discomfort. True, mutual acceptance and respect for the diagnosis made and treatment recommended and effected is the custom. Nevertheless, too frequently, the orthodontist, guided perhaps by an impression of his own infallibility that has resulted from too-long confinement within the narrow horizons of his own specialty, with consequent restriction of his field of view as applied to the dental problem as a whole, makes unreasonable demands upon the oral surgeon. The oral surgeon, too, is guilty of this same breach of intellectual honesty. Unfortunately, such incidents very frequently provoke a conflict of ideas, each man firmly refusing to accept criticism or the other's point of view. It would be far more conducive to the integrity of the profession as a whole if such purely personal bias and jealousy were eliminated by the thoughtful men of each specialty, and in their place substituted intelligent, scientific consultation. For, as Sir Thomas Brown has so beautifully stated in *Religio Medici:*

"I make not, therefore, my head a grave, but a treasure of knowledge; I intend no monopoly, but a community of learning; I study not for my own sake, but for theirs that study not for themselves. I instruct no man as an exercise of my knowledge, but with an intent rather to nourish and to keep it alive in my own head than to beget and propagate it in his. I cannot fall out or condemn any man for an error, or conceive why a difference of opinion should divide an affection; for controversies, disputes, and argumentations, if they be met with discreet and peaceable natures, do not infringe the laws of charity; in all disputes, so much as there is of passion, so much there is of nothing to the purpose, for then reason, like a bad hound, spends upon a false scent, and forsakes the question first started. And this is why controversies are never determined; for though they may be amply handled, they do so swell with unnecessary digressions; and the parenthesis of party is often as large as the main discourse upon the subject."

The suggested message from this quotation prompts the request that tolerance be extended this effort and wherein shortcomings of exactness in positive statement are apparent, be reminded that much theorizing was required for its preparation. Primarily, it was intended as but a stepping-stone toward a better understanding between the orthodontist and the oral surgeon on the still unsatisfactorily answered orthodontic question, i.e., indications and contraindications for the removal of the impacted third molar.

This problem has caused—and will continue to cause—much confused and uncorrelated thinking by both orthodontist and oral surgeon. However, if this paper serves to stimulate further serious consideration which will lead to an ultimate solution—one that will prove satisfactory to the orthodontist—then it will have completely accomplished its purpose.

THE ROLE OF OSTEOBLASTS AND OSTEOCLASTS IN OSTEOGENESIS

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IT IS interesting in the review of the English literature on the subject of osteogenesis to see the different opinions held by various authors on the role that osteoblasts and osteoclasts play.

First we will consider the work of Leriche and Policard. According to them, in a connective tissue which is to become ossified, there are some modifications involving the interstitial substance. These modifications are:

1. Edematous infiltration
2. Multiplication of the connecting fibrils
3. Deposition of a preosseous substance

The connective tissue cells also undergo important modifications, the most notable consisting of their swelling and hypertrophy. While preserving their general morphologic character, they become more voluminous and show numerous mitoses. While in this state they are called osteoblasts. The chief histologic difference between osteoblasts and ordinary fibroblasts is that the osteoblasts stain more deeply with the basic dyes and are located at points where new bone is being formed. When the cell has taken on the characteristics of an osteoblast, it ceases to multiply by karyokinesis.

Following their increase in length the cells never show cytologic signs of secretion. These cellular transformations are never produced prior to edematous infiltration. According to some the whole process of osteogenesis has been attributed to the osteoblasts, but Leriche and Policard contradict this idea since the formation of the osteoblast is secondary to edematous infiltration.

In view of the majority of authors, osteoblasts are connective tissue elements of some sort, which have acquired, by an indefinite mechanism, the capacity to secrete bone substance.

Leriche and Policard believe there is no coincidence between osteogenesis and the presence of osteoblasts. One of the questions they ask of the other theory is: "If the osteoblasts secrete preosseous material, why does one not encounter among them cytologic evidence of a secretion?" No method has shown evidence of secretory antecedents in these cells.

One of the essential points in the classical theory is the absolute coincidence of osteoblastic deposits with formation of new bone. Leriche and Policard found an absence of osteoblasts in face of new bone formation the existence of which was established by macroscopic and radiographic observations and conversely at points where there was no osteogenesis, but on the contrary, arrest and limitation of bone—rows of osteoblasts of the epitheliod type were found. They further accept with difficulty that an alleged specific element exercises two absolutely opposed functions as in the osteoclasts which arise from fusion of osteoblasts.

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How, then, is the formation of preosseous substance to be explained? In certain zones, quite distant from the blood capillaries a transformation takes place in the fundamental connective tissue substance. Leriche and Policard have the impression that the transformation arises from a physiochemical modification of the connective tissue substance and of the interstitial lymph which it takes up. It results from a humoral process, a sort of thickening and coagulation. The only cellular action which is admissible in the course of these changes is an indirect one by means of the secretion of diastases which act upon the fundamental substance. These modifications seem reversible. In resorption one sees the effacement of the usual aspects of preosseous substance and the reappearance of the fundamental connective tissue framework.

In the course of preosseous transformation, the osteoblasts immersed in the new substance become bone cells without much change of form. The most important modifications take place after the deposit of calcium salts.

A certain number of cells degenerate and disappear. There are fewer bone cells than there were osteoblasts. Generally they disappear through a progressive effacement. Nevertheless one can see vacuoles and basophilic particles in some of the cells. These are not signs of secretion, but are rather signs of regeneration.

Leriche and Policard think that the osteoblasts might perhaps present reactionary forms of the connective tissue cells in the presence of the modifications of the connective tissue medium in which they live. The transformation of the connective tissue cells into osteoblasts is the result of the change of the medium.

There is a very exact equilibrium between the connective tissue cell and its medium. When the connective tissue medium undergoes preosseous transformation, there are a modification and adaptation of the cell; in other words, the cell seems to struggle against the transformation and thickening of the medium in which it lives. It tends to oppose it. As the connective tissue cells and phagocytic elements tend to become enlarged and to accumulate around a foreign body in order to dissolve it, they undergo a hypertrophy which leads to the formation of osteoblasts which are grouped at certain points and lead to the formation of osteoblastic deposits. Their enlargement (hypertrophy) may end in the formation of elements with many nuclei, the osteoclasts, the dissolving power of which becomes evident. The presence of the osteoblastic deposits expresses, in short, reactionary attempts of the cells against the preosseous transformation which congeals their medium.

Hypertrophic activity approximates degeneration, a great number of osteoblasts die; there is no longer anything to check the thickening of the medium. The preosseous framework is formed and is the essential point of osteogenesis. The calcium deposit which follows represents a commonplace biological phenomenon.

The origin and function of the osteoclasts have been under as much controversy as the osteoblasts. They have been likened to fused osteoblasts—vascular endothelial cells and reticular cells of the marrow.

According to Leriche and Policard osteoclasts often result from the fusion of osteoblasts or their hypertrophic development with multiplication of their

nuclei. One does not see mitosis in the course of this development. Osteoclasts are, therefore, not elements of a uniform origin. They may arise from fibroblasts, osteoblasts, reticulo-endothelial cells and, stranger still, from sarcoma or epithelioma cells.

The only point of agreement on the action of the osteoclasts is the slowness with which they act. Some think that this simple pressure on bone could bring about resorption (Shipley and Macklin). Others believe that the osteoclasts secrete a substance which dissolves the calcium with which it is in contact.

In the action of the osteoclasts the authors feel there is not only calcium resorption but also destruction of the ossein matrix. The osteoclasts supplant the entire bone, collagenous support, connective fibrils, and combined calcium. In short, osteoclasis is a variety of phagocytosis and the osteoclast a variety of phagocyte. They feel the fact that the elements do not take up pyrol or trypan blue like other phagocytic elements is nonconsequential.

Maximow and Bloom believe that bone always develops as a transformation of embryonic or adult connective tissue. When this occurs in cartilage, it is called endochondral ossification and is usually contrasted with simple intramembranous bone formation. The only difference between them is that one occurs within cartilage which must be removed before ossification can take place. In both cases, however, the actual process of the laying down of bone is identical. The first bone formed is always spongy; it later becomes compact through internal reconstruction.

The first signs of bone development are thin acidophil bars of dense intercellular substance which run between the cells; they soon become thicker and wider, and often unite with one another to form a network, in whose meshes the cells remain. At the same time the cells increase in size and become surrounded by the bars.

At the margins of the bars the fibrils passing out the newly formed bone substance continue into the collagenous fibers of the surrounding connective tissue. The first interstitial bone substance or preosteal tissue soon calcifies and hardens.

The hypertrophied mesenchymal cells produce the interstitial bone substance and are now called osteoblasts. While the bone grows, osteoblasts remain on the surface in an uninterrupted layer of cells suggesting a cuboidal epithelium. Between the lateral surfaces of the osteoblasts, spaces always remain through which fibrils pass from the surrounding connective tissue into the bone.

At any time, new osteoblasts may form in the adjacent connective tissue from mesenchymal cells. The bone plates increase in size through the activity of the osteoblasts. Successive layers are added to the fibrillar mass which is being calcified while the osteoblasts gradually move toward the exterior. As the plates become thicker, some of the osteoblasts which lie on the surface are included within its substance; these are the first bone cells or osteocytes and lie in cavities called lacunae. But most of the osteoblasts continue to remain at the periphery and, with the gradual thickening of the layers of the interstitial substance, they move away from the cells which remain inside of the interstitial substance in the form of osteocytes.

In the process of endochondral bone formation the hyaline cartilage undergoes degenerative changes, disappears, and is replaced by bone which develops exactly as in intramembraneous ossification.

With the first appearance of bone, in connective tissue and in cartilage, the destructive process, a function of multinucleated giant cells, called osteoclasts, begins. These originate from the mesenchymal cells of the embryonic bone marrow. Osteoclasts probably possess a certain capacity for movement; they have an extremely varying irregular form and are often provided with branching processes.

It is generally believed that the cytoplasm of the osteoclasts produces a substance which dissolves the bone. Where they touch the surface of bone lamellae, the substance of the latter dissolves. Sometimes deep grooves, lacunae, are formed in which these osteoclasts are located.

When the osteoclasts are no longer needed in a particular location, they separate into mononucleated cells and return to their original cell type in the bone marrow. The space resulting from the activity of the osteoclasts is then filled with marrow and new bone.

The direct cause which makes adjacent cells in a growing bone become either osteoblasts, which form the bone, or osteoclasts, which destroy it, is unknown.

According to Ham, so far as the bone cell and its matrix are concerned there is no difference between the development of membrane or endochondral bone, each arising *because of specialization of less differentiated cells.* In an area in which intramembranous ossification is to occur, certain of the cells show signs of specialization toward bone formation which is evidenced by a change in the shape of the cells and by the formation of a distinctive type of matrix. The cells evidencing specialization become larger and demonstrate an increased amount of even-staining basophilic cytoplasm. This change in character of the cell is accompanied by the formation of an additional type of matrix which is of a solid-appearing nature. The cells during the process of matrix formation, particularly in its early phase, are *osteoblasts.*

Intramembranous bone formation does not occur in a massive fashion, but rather it is seen to begin in many isolated points and the first formed matrix is relatively small in amount. Furthermore, not all of the cells which appear to be specific for differentiation into bone cells complete their development, but, on the contrary, appear to remain as a source of supply for more cells of this type. These remain usually on the surface of the bone matrix, where mitotic division is not uncommon, and some of the resulting cells undoubtedly complete their differentiation into bone cells. On the other hand, the mechanism allows for a constant reserve of cells of a specific type, and as bone formation progresses, these reserve cells may be found scattered along the surface of the matrix, comprising the deep layer of periosteum and the endosteum. Consequently, it is seen that the growth of the membrane bones is dependent on the mitosis of the reserve or osteogenic cells, and on the differentiation of a portion of the products of division into bone cells. On the other hand, bone cells may be added to by the differentiation into bone of other cells of the mesenchyme in which the first bone formed. The latter process, however, tends to diminish in importance, the

growth of membrane bones in postnatal existence being largely accounted for by the proliferation and specialization of the osteogenic cells which line the bone on its various aspects.

Ham terms the lining cells of bone "osteogenic" instead of designating them osteoblasts. He does this because he feels that it is questionable if the development of either cartilage or bone from osteogenic cells is not largely a result of the environment under which the cell differentiates rather than the specific inherent tendency of the cell. He grants that young cartilage cells, or chondroblasts, or young bone cells, or osteoblasts, have attained certain specificity, but the lining cell of bone, which has been termed the osteogenic cell, demonstrates capability to proceed along either the cartilage or bone pathway.

It appears that environmental conditions in the areas of membrane bone formation are suitable for the differentiation of osteogenic cells into bone. It is hard to make a complete analysis of the environmental factors, but one point is worth noting, namely, the vascularity of the medium. In this type of ossification (intramembranous) bone formation first appears in the form of a network of spicules interwoven with a network of blood vessels.

In endochondral bone formation, at the beginning of the process, certain osteogenic cells enlarge, show an increased amount of cytoplasm and differentiate into osteoblasts which surround themselves with matrix and become young bone cells.

Irrespective of whether bone develops by the endochondral or intramembranous route, it may assume either a compact or a cancellous type of structure. Both kinds are composed of cells and calcified matrix so that the difference in the two varieties lies in the architectural arrangement of their basic constituents which are the same in both instances.

Adult bone cells represent the maturity in development of the osteogenic cells which have completed their differentiation through an osteoblast phase. During the course of the latter part of development they presumably create the matrix which finally surrounds the cells, leaving them in cavities known as lacunae.

Although it has been indicated that the osteoblast functions in the process of matrix formation, we find that the first sign of a matrix is evidenced by the appearance of interwoven fibers cemented together by an amorphous material.

Bone matrix tends to become arranged in layers or plates (lamellae). The cardinal principle behind the understanding of the lamellar structure of bone is the realization that bone does not, to any extent, grow because of proliferation of the osteocytes, but on the contrary its mass is added to by the matrix formed because of differentiation of a fresh generation of osteogenic cells. It should be noted that not all the lining cells complete their differentiation at the same time, but some always remain in reserve to provide by proliferative activity a fresh group of cells for additional differentiation and growth.

In summing up, we might say that, according to Ham, the essential in bone and cartilage formation is specific cells which manufacture a matrix of the bone or cartilage variety which has a physiochemical property of taking up calcium.

Ham feels that osteoclasts do not originate from osteoblasts but rather that each represents the differentiation of the osteogenic cells along different pathways.

Osteoclasts may be considered as arising in response to a foreign body stimulus from the most readily available source, which in growing and regenerating bone is the relatively undifferentiated osteogenic cell. They probably function in bone resorption in a nonspecific way, by the fact that they form carbon dioxide, which dissolves dead bone matrix, and that they may, if the opportunity presents itself, phagocytize to a small degree the products of tissue disintegration. They should not, however, be considered as specific agents of bone resorption because their function in this respect is common to all cells producing CO_2. Their phagocytic capabilities appear to be limited, and it is very dubious if they function in this respect except to incorporate within their cytoplasm small amounts of the products of tissue disintegration.

SUMMARY

	LERICHE AND POLICARD	MAXIMOW AND BLOOM	HAM
1. Matrix	Development without influence by cells	First development without influence of cells, later under influence of osteoblasts	Derived as product of specific cells
2. Histogenesis of osteoblasts	From C.T. cells, by differentiation under influence of matrix	From mesenchymal cells simultaneously with matrix formation	Arising from specialization of less differentiated cells
3. Function of osteoblasts	Restriction of growth of matrix	Formation of interstitial substance	Formation of matrix
4. Histogenesis of osteoclasts	Fusion of osteoblasts; fibroblasts, reticuloendothelial cells	From mesenchymal cells	Osteogenic cells
5. Function of osteoclasts	Ca. and matrix resorption	Dissolution of bone	Form CO_2 which dissolves bone matrix phagocytic

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THE REHABILITATION OF CHILDREN WITH CLEFT PALATE, HARELIP, OR BOTH

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IT IS estimated there are 250,000 people in the United States with a cleft palate, a harelip, or both. All of them have some degree of speech defect.

The speech defect and malformed facial contours, especially about the nose and lips, cause this large group of people to have a feeling of inferiority, to consider themselves social outcasts, which in fact many of them are, due mainly to the fact that so few of them receive any dental or orthodontic care, or speech training.

Surgical repair of these children is completed in two or more stages, starting with the repair of the palate about age 2. Later plastic surgery about the lips and nose very often follows.

Except for the primary closure of the cleft lip, which is usually accomplished within the first month following birth, many of these children receive no further aid during their lifetime.

Dental and orthodontic aid and speech training are especially valuable to these children during the developmental period of 5 to 12 years of age.

The surgeons at the Children's Hospital in Boston, during the years 1930 to 1935, operated on an average of six infants a month to close a cleft lip or palate. At our clinic three orthodontists, one general dentist, a speech correctionist, and two volunteer assistants are now trying to rehabilitate as many of these children as possible.

Except for clefts in the palate or lip due to pathology or traumatic injury, the most probable etiology seems to be heredity.

The problems encountered in treatment are many and varied as follows: Unilateral clefts with and without openings to the nasal passages, the premaxilla displaced to one side or the other, bilateral clefts usually with an opening on each side, extending posteriorly as well, frequently a very loose premaxilla that may contain two to four incisors. These incisors may be well formed, or one or more malformed, or all of them rotated in any of the directions of the compass.

What to do with this loose premaxilla and its contents is perhaps our greatest problem.

Open-bites, extreme overbites, cross-bites, hypoplasia of the mandible, prognathism, sometimes real, I think, frequently are a pseudo-prognathism due

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to the failure of the forward and downward growth of the maxilla; more often it is lack of maxillary structure.

The extremely contracted arches and destroyed tooth germs are less frequently encountered now, because most of the surgeons have discarded the technique of passing wires through the maxilla and the use of clamps, which forced the lateral portions of the maxilla together.

Fig. 1.

Fig. 2.

Fig. 1 (L. Q., front view).—Treatment started at age 5 years 2 months. Bilateral cleft palate. This case shows a free-moving premaxilla which necessitates the removal of part of the premaxilla, establishment of width of the posterior segments for more normal growth and development, and a restoration both to close the palatal cleft and for esthetics.

Fig. 2 (L. Q.)—Side view shows the extent of the cleft at start of orthodontic treatment. Due to the limitations of surgery, it sometimes becomes impossible to close the cleft entirely, and therefore a restoration must be made to prevent food and fluids from passing up into the nasal cavity.

Fig. 3.

Fig. 4.

Fig. 3 (L. K.).—Treatment started at age 6 years, 1 month. Bilateral cleft palate. This is the palatal view showing the opening in the palate and the central incisors in the free-moving premaxilla. The upper lip is attached near the cervical border of the incisors, therefore not permitting the free movement of the upper lip which must be repaired with an epithelial graft at a later date. The boy has the congenital absence of many teeth.

Fig. 4 (L. K.).—This view shows an acrylic pad made on a lingual arch wire to close palatal opening and extending up into the clefts on both sides of the premaxilla. These patients are very happy with their restoration for it aids them in their speech, and they are extremely uncomfortable when they have to be without it.

With a bilateral cleft, there is frequently a tremendous amount of scar tissue, and the vermilion border of the lip is attached at the cervical margin of the incisors, thus making the lip immobile. An epithelial graft is necessary to correct this condition.

Many dentists seem to be afraid to do any kind of dental work for these children. To extract a tooth, regardless of how simple the procedure, is entirely beyond them, because they think an extraction may undo the work the surgeon has completed.

Of course, the economic factor helps to influence the dentist to avoid rendering a dental service for these children.

Fig. 5.

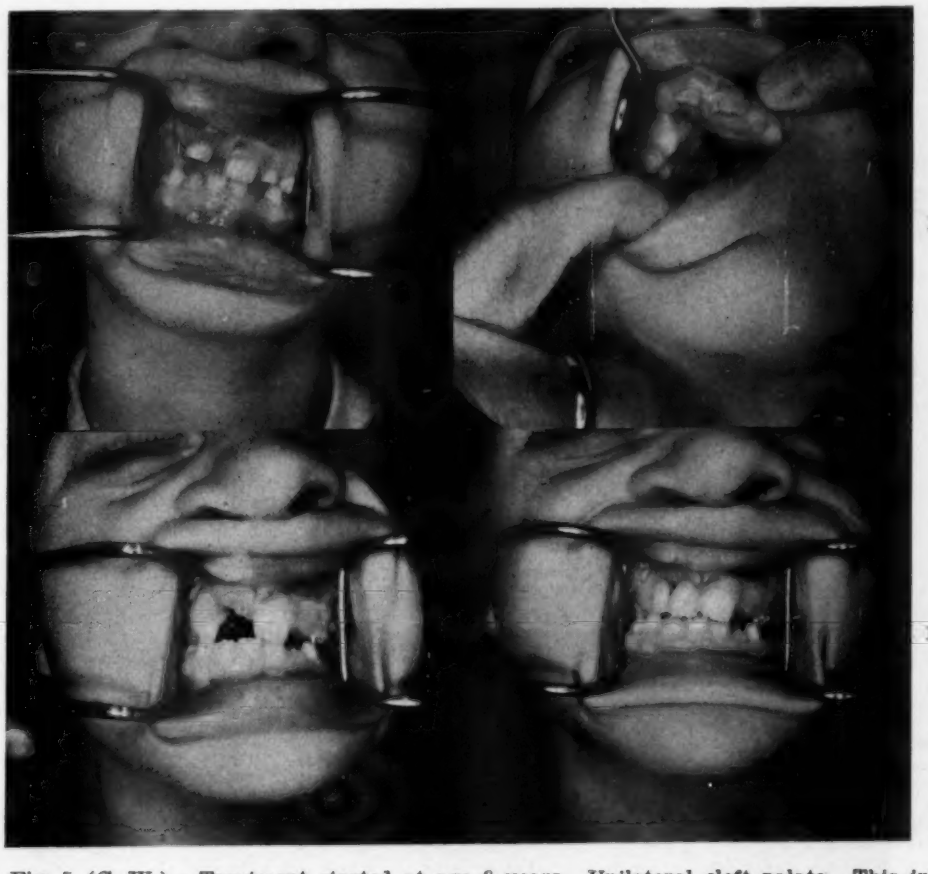

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 5 (C. W.).—Treatment started at age 8 years. Unilateral cleft palate. This intraoral view shows the collapse of maxillary buccal segment which is common to these unilateral cases. With orthodontic treatment establishing normal relations, good arch form can be obtained allowing normal growth to continue, preventing some of the severe deformities we see in later life.

Fig. 6 (C. W.).—Palatal view showing unilateral collapse of maxilla which, of course, will have to be retained after treatment.

Fig. 7 (C. W., front view).—Congenital absence of tooth in the line of the cleft and a malformed central incisor necessitated surgical interference in conjunction with orthodontic treatment.

Fig. 8 (C. W.).—Front view shows restoration made for missing maxillary incisors during orthodontic treatment. These children are so self-conscious of their deformity that anything which helps them esthetically is of tremendous value, which has been particularly noticeable in this child.

Relative to orthodontics, we are frequently asked this question: "When you expand the arch to obtain the proper width, do you increase the size of the cleft and destroy the surgeon's repair?"

Our answer is based on the treatment of nearly 100 cases. There is no evidence that we have increased the width of the cleft or injured the surgeon's repairs in any way. On the contrary, our treatment has been complementary to the surgeon's.

Orthodontic treatment and general dental care can be given the cleft palate child with the same confidence one would treat the normal child.

The policy of early treatment was adopted when this clinic was first started, and, after more than ten years, we are convinced that orthodontic and dental treatment rendered to this class of patient between 5 and 12 years of age is of the greatest benefit to them. We prefer to start the treatment as soon after 4 years of age as possible.

Fig. 9.

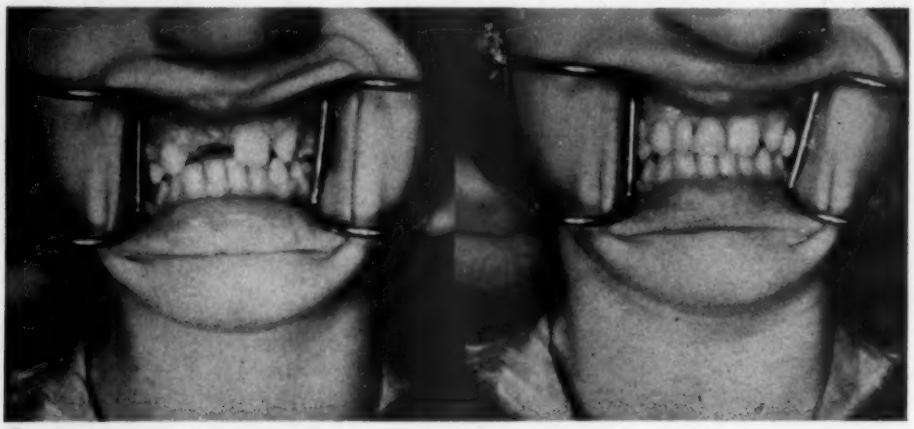

Fig. 10.

Fig. 9 (M. A.).—Case started age 9 years, 3 months. Unilateral cleft palate, original case was Class III. This view shows case after orthodontic treatment. Congenital absence of teeth will be restored with artificial restoration.

Fig. 10 (M. A.).—Front view with artificial restoration in position giving a good esthetic result and acting as a retainer for the maxillary arch.

Fig. 11.

Fig. 12.

Fig. 11 (T. C.).—Treatment started age 4 years, 1 month. Large unilateral cleft which presented many problems in closing. Due to age of patient and lack of cooperation in handling removable restoration, it was locked into tubes on the canine and molar bands.

Fig. 12 (T. C.).—Front view shows cleft closed with artificial restoration. Study of this case by the hospital staff as a research problem has been undertaken to determine the complications of wearing a denture without removal. In this boy's case the mucous membrane became inflamed and irritated, but he experienced no discomfort or apparent harm. In fact, the staff rhinologist felt that the tissues of the nasal cavity and adjacent structures looked far better than other cases where no artificial closure was made, which of course permitted food and fluids to get through the palatal opening.

Normal arch form and cuspal relations are restored as early as it can be accomplished. Openings in the palate are closed with a dermoid or acrylic pad, or partial denture at once, thereby preventing fluids and other debris from

entering the nasal passage to dribble from the nostril over the lip and chin. This, also, restores these open areas to a more nearly normal condition which tends to prevent the child from acquiring faulty tongue habits as he progresses and aids him in speech. Supernumerary teeth are nearly always present, especially at the site of the cleft. Sometimes one of these teeth can be moved with satisfactory results; more often it is necessary to extract them.

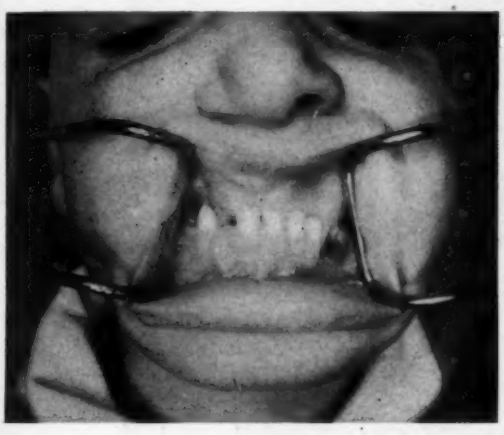

Fig. 13.

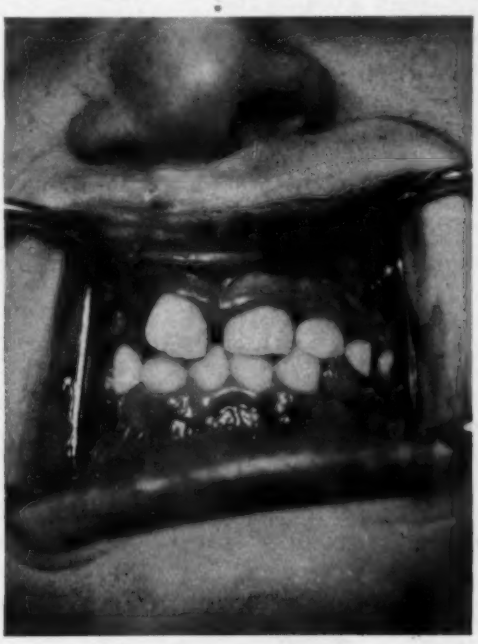

Fig. 14.

Fig. 13 (J. S.).—Treatment started age 9 years 2 months. Unilateral cleft palate, intraoral view. Class III case before orthodontic treatment, showing the linguoversion of the maxillary incisors.

Fig. 14 (J. S.).—Intraoral view. Progress of orthodontic treatment, showing establishment of normal anteroposterior relationship.

Fig. 15.

Fig. 16.

Fig. 15 (J. S.).—Profile view, before orthodontic treatment, showing lower lip protruding, and, of course, the upper lip which is deficient exaggerates the Class III appearance.

Fig. 16 (J. S.).—Profile view, progress of orthodontic treatment, showing improvement of facial contour. Because of the lack of maxillary structure, the correction of the anteroposterior relationship and stimulation of the maxillary anterior segment early in these cases is all the more important.

Frequently the permanent lateral incisor at the site of the cleft is missing, and the central incisor is frequently malformed or erupting in such a position that it is impossible to try to move it to a correct position.

If the child has a bilateral cleft, it is sometimes necessary to remove all of the teeth erupted in the premaxilla, and in the extreme cases the partial or complete removal of the premaxilla. Then a restoration for this area is essential.

The greatest reward for our efforts in the treatment of these children is derived from the insertion of a restoration as early in their lives as it can be accomplished.

Fig. 17.

Fig. 18.

Fig. 17 (J. S.).—Front view of models, showing comparison of case before and after orthodontic treatment.

Fig. 18 (J. S.).—Side view of models showing comparison before and after orthodontic treatment.

Fig. 19*A*.

Fig. 19*B*.

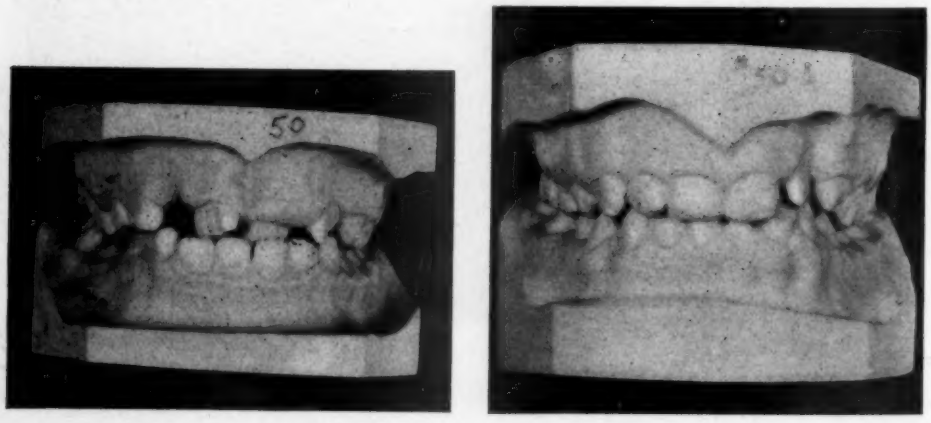

Fig. 19 *A-C* (M. K.).—Treatment started age 7 years 6 months. Unilateral cleft palate. Front view of models before and after treatment and intraoral photo of completed case, showing good arch form except for lateral incisor. Because of lack of bone in the line of the cleft, it is very often difficult to maintain such a tooth in a perfect position, but esthetically it is a very satisfactory result.

The child with a cleft lip and palate carries a chip on his shoulder and an expression of resentment in his eyes toward the world in general and toward the "kids" that plague him because he has no teeth like other children and does not talk well.

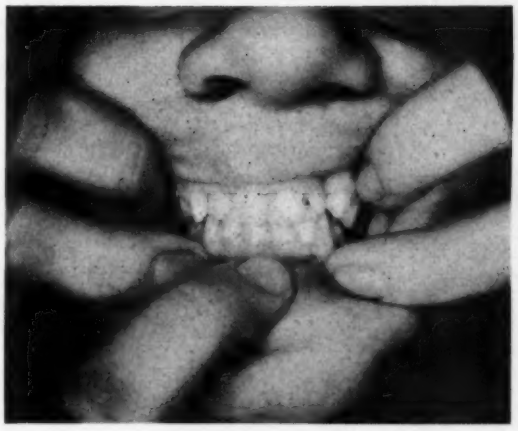

Fig. 19C.

Fig. 20.

Fig. 21.

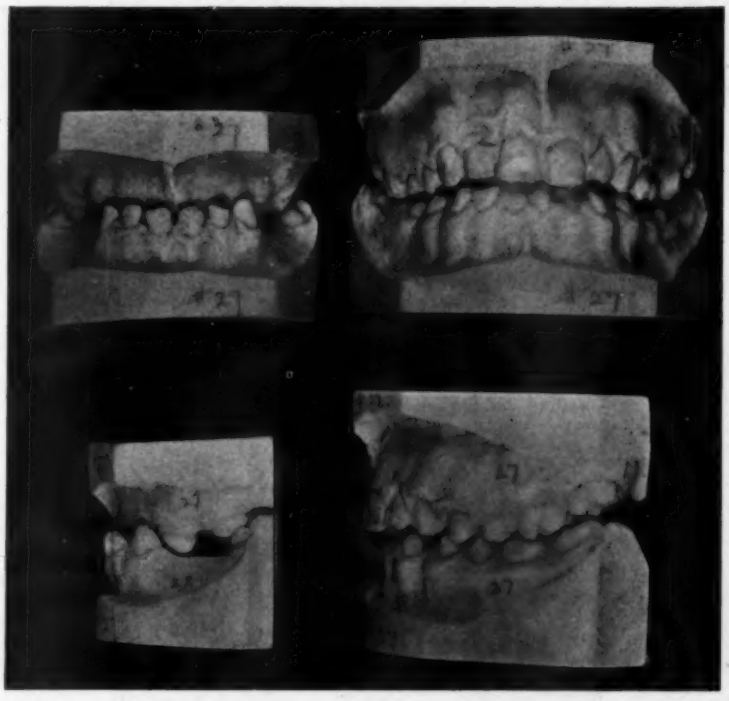

Fig. 20 (A. S.).—Treatment started age 6 years. Cleft of the soft palate. Class III case, showing front view of models before and after treatment.
Fig. 21 (A. S.).—Side view of models before and after treatment.

One week following the insertion of a restoration, the expression on the face and eyes is entirely changed and presents a happy and cheerful appearance, and the speech is improved at once.

It is nearly impossible to keep the restoration even one day if changes or repairs are necessary. In fact one child of 8 became hysterical and refused to

leave the clinic without her restoration. A makeshift repair and the promise of a new restoration was necessary to quiet her.

We depend on clasps, which usually engage a lug on a convenient tooth, to retain the restoration. Natural growth changes alter the original accurate fit of the restoration, but the growth changes are slow and, within proper limits, can be disregarded for many months.

Fig. 22 (A. S.).—Front and profile views of patient after treatment, showing well-developed facial contour.

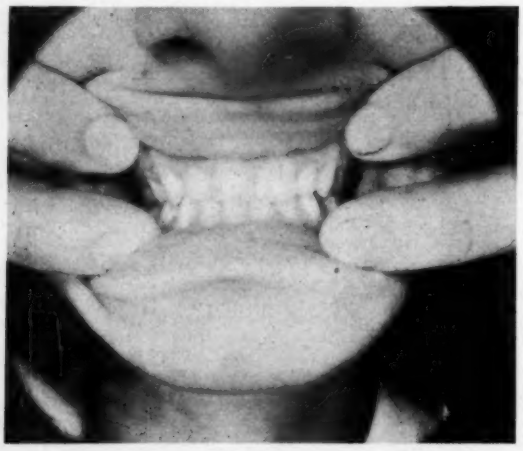

Fig. 23 (A. S.).—Intraoral view, after orthodontic treatment, showing full complement of teeth. Line of cleft did not extend through the alveolus, and therefore we have no break in the continuity of the arch.

Fig. 24 (R. S.).—Treatment started age 6 years. Unilateral cleft palate, missing maxillary right lateral incisor in the line of the cleft. Space was closed, and the completed case presents an excellent occlusion and good arch form.

Rebuilding the restorations is not frequent enough to be a handicap, and fear of restricting the growth of the arch can be disregarded.

Some of the appliances can be allowed to remain in the mouth one to six weeks, sometimes longer, without removal, with no serious damage to the tissue.

At most there may be a slight irritation, not uncommonly seen under a denture. The aid to improved speech alone, that the child derives from any restoration, warrants their use as early in the child's life as possible.

The medical dictionary defines an obturator as a disk or plate, natural or artificial, which closes an opening. A dentist or orthodontist thinks of an obturator as a denture, with a hinged or solid bulb attached to the denture, extending posteriorly as a substitute for the soft palate and uvula. We have not constructed any obturators of this type.

Recordings of the children's speech are made and repeated at intervals, so that they can note their mistakes and progress toward better speech. A definite problem of sound or muscle control is assigned the child and parent each visit. This assistance is eagerly accepted.

This presentation is a summary of our experience in treating nearly 100 cases.

THE CONSTRUCTION OF BITE PLATES FROM ACRYLIC AND CHROME ALLOY USING THE PRYOR INJECTION FLASK

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THIS paper does not deal with the indications or contraindications for bite plates and retainers, or the tissue changes resulting from their use. But it will be confined to the technique of the construction of bite plates.

It should be understood in the beginning that satisfactory results can be obtained by processing acrylic in the ordinary vulcanite flask, which, of course, requires no special equipment. The technique to be described is only one way of processing acrylic and is a very accurate one, from which definite and satisfactory results can be expected when properly used.

Chrome alloy and acrylic have to a large extent replaced other materials in the construction of Hawley retainers and bite plates.

THE TECHNIQUE OF CONSTRUCTION

Using an accurate stone model made from a hydrocolloid or plaster impression, 3 ten-thousandths tin foil is adapted to the palate and the lingual surfaces of the teeth. There are various adhesives which may be used for gluing the tin foil to the model, such as banana oil, sandarac varnish, and a number of proprietary products. But it has been found that most of these cause difficulty in removing the tin foil from the finished denture. So to minimize this difficulty, vaseline may be used as an adhesive agent with satisfaction. After the tin foil has been carefully adapted and glued to the model with vaseline, we are then ready to place on the model the labial wire which has been previously adapted. This is held in place by flowing base plate wax on the lingual or palatal extensions. We are now ready to apply the wax. This may cover the entire palate as far back as the distal of the first molars or it may be so-called "horseshoe" shaped. This will depend upon individual preference.

After the wax has been applied and carved to the exact shape which is desired, the case is ready to be flasked. The ordinary vulcanite flask may be used where acrylic and chrome alloy are to be used. If the Pryor injection flask (Fig. 1) is to be used, then three wax sprues are attached to the denture. They are located in the region of each of the second premolars and in the midline just lingual to the central incisors. These sprues are so directed that they converge at a common point in the center of the model, so this point will be in the center of the flask, as may be seen in Fig. 2.

The lower half of the flask is poured in plaster of Paris and allowed to set. Then separating medium is applied and the upper half is poured. While the plaster is still soft in the upper half of the flask, the lid of the injection flask is placed on and the plunger is pushed down into the soft plaster until it meets

Read before the New York Society of Orthodontists on Feb. 24, 1942.

the sprue. The model has been placed in the flask so that the plunger will come in contact with the point where the three sprues meet.

After the plaster is allowed to set and the wax softened by placing in hot water, the flask is opened in the usual way. Then by removing the plunger and dissipating the wax sprues, there is produced a communication from the inside to the outside of the flask, even when it is closed.

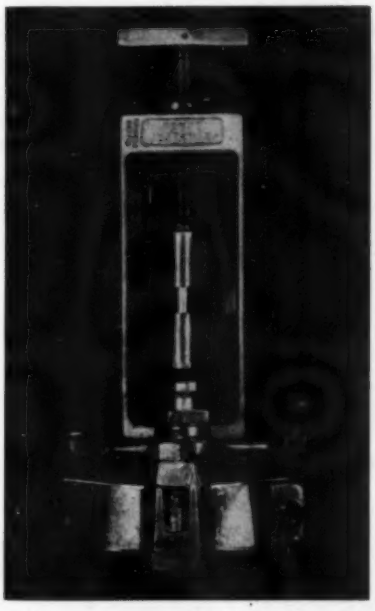


Fig. 1.—The Pryor injection flask.

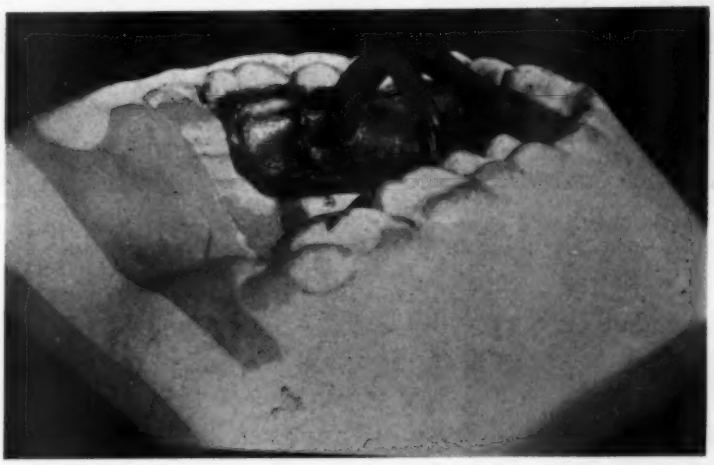


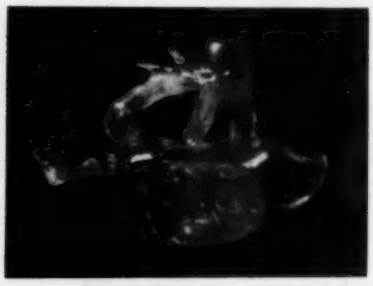
Fig. 2.—A case invested in the lower half of the flask, showing the wax sprues.

We are now ready to fill the mold with acrylic. It is available in different forms, but the powder and liquid have proved to be very satisfactory for this technique. It is available under many different trade names and the technique of mixing varies with each one. So the most reliable guide to the proper method of preparing the acrylic is the manufacturer's directions which accompany the product.

The mold is slightly underfilled instead of overfilled as is the usual procedure with other types of flasks. Then the flask is closed tightly and bolted down. The cylinder or hole made by the withdrawal of the plunger is partially or completely filled with acrylic, depending upon the need. The injector is now placed on the flask, and by tightening the screw on the top, the plunger compresses the acrylic in the mold. This pressure remains constant inside the mold throughout the processing, by virtue of a spring in the injector. The processing consists of boiling in water in an open pan for a period of forty-five minutes. The flask is now cooled and opened, and the case finished in the usual way.

Chrome alloy lends itself very satisfactorily to the construction of all the different types or designs of bite plates and retainers. Of these many types only three will be considered here. The first one is what might be called a one-piece or continuous type of retainer (Fig. 4). From 29-thousandths to 31-thousandths wire is usually used for the labial wire, and it is extended back to the premolar regions to form the clasps around the second premolars. The wire is adapted along the labial surfaces of the six anterior teeth, and then extended to the lingual through the embrasure between the cuspid and first premolar teeth, to be engaged by the acrylic; after which it is again brought over on to the labial surfaces of the second premolars to form the clasps. The advantage of this, of course, is that no soldering is required and the temper of the wire is undisturbed.

Fig. 3.



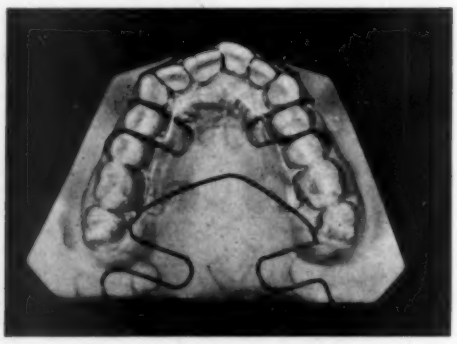


Fig. 4.

Fig. 3.—A case finished in clear acrylic, showing the sprues in place.
Fig. 4.—A one-piece bite plate made of clear acrylic and chrome alloy. The labial wire is shown separately.

There is another type (Fig. 5) which is very similar to the one just mentioned, but is somewhat simplified. It is made of three pieces, the clasps being separate from the labial wire. The advantage of this is that less time is required in the adaptation of the wire.

The third type (Fig. 6) is the one perhaps most commonly used by the majority of orthodontists, and which requires two soldered joints on each side. It is very easily and satisfactorily made with gold alloy wire. If a reliable soldering technique for chrome alloy has been worked out, this type of bite plate is also very easily constructed with chrome alloy. The only possible advantage of this over the other types is the possibility of adjustment of the clasps.

As is well known by all orthodontists, the weakest point on the denture, and the point which is subject to most frequent breakage, is the labial wire at the

point where it emerges from the acrylic. As a means of partially overcoming this breakage the following procedure may prove helpful:

Using a small pointed flame, the chrome alloy wire is heated to a dull red color at this point and allowed to cool slowly. Care should be taken to heat only a short section of the wire at the point which will lie in the embrasure between the cuspid and first premolar teeth. This procedure should remove only a part of the temper or spring of the wire which does not diminish its effectiveness. It has been found by means of the cold-bend test, that in this way the

Fig. 5.

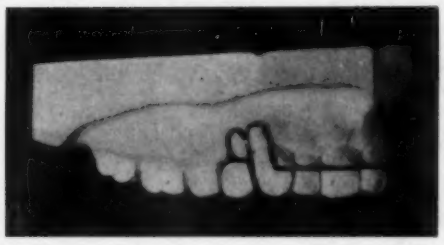


Fig. 6.

Fig. 5.—A three-piece bite plate made of clear acrylic and chrome alloy. The clasps are separate from labial wire.

Fig. 6.—A bite plate made of chrome alloy using two soldered joints on each side.

resistance to fatigue at this point has been increased 100 per cent. If we take a 30-thousandths chrome alloy wire which has not been heated and place it firmly in a vise, it will stand three bends before breaking. Then if we heat this same wire to dull redness and allow to cool and place in a vise, it will stand six cold bends before it breaks. According to these findings, the breakage at this point should be diminished 100 per cent. Whether or not it works out this way in actual practice, the author is unable to say.

The author wishes to express his appreciation to Axel Hanson for the photography and slides; and also to Columbia University Orthodontic Department for the use of the necessary facilities.

AN ORTHODONTIC AND PROSTHETIC RESTORATION IN THE MOUTH OF THE LARGEST MAN IN THE WORLD

ROBERT I. FRANKS, D.M.D., LOS ANGELES, CALIF.

THE dentist—whether he be orthodontist, prosthodontist or reconstructionist—is primarily interested in restoring a mouth to function and comfort. Often, a case presents with an unusual formation of the jaws, defeating the purpose for which the teeth were intended. To handle the case successfully and accomplish the desired results, one must resort to treatment out of the ordinary.

One such very outstanding example, Mr. Jack Earl, presented himself for treatment. He is the tallest man in the world, eight feet six and one-half inches in height, and weighs approximately 375 pounds. Fig. 1 shows Mr. Earl standing with Dr. Franks and Mr. Owens, who are approximately six feet tall.

The medical history is highly interesting. At the period of life when the growth of the average person is completed, Mr. Earl continued to grow. The cause of this phenomenon was a tumor of the pituitary gland, located at the base of the brain, and due to the inaccessibility of the afflicted part for surgery, nothing could be done. Physical growth thus continued to an extraordinary degree. In time the pressure of the growth on the surrounding structures began causing severe headaches and marked eye symptoms, causing partial loss of sight. In his 20's he was given x-ray treatments. This checked the growth, and the symptoms disappeared.

His mental capacity is very good, and he has more than average intelligence. He is interested in sports and is an ardent fisherman. His works in painting and photography have been shown in various art salons. For years he was an attraction in the circus, but of late he has a responsible position with a large corporation.

The hypersecretion from the pituitary gland caused an excessive growth of the long bones. The mandible grew out of all proportions to the other bones of the head and carried the mandibular teeth far external to those of the maxilla. The result was that he could not occlude his teeth through any position or excursion of the mandible, except the distobuccal cusp of the maxillary second molar on the mesiolingual cusp of the mandibular third molar. This was not accomplished without severe effort. The situation is shown in Fig. 2. Fig. 3 shows the bite demonstrating ¾-inch overjet and severe overbite.

Presented before the American Association of Orthodontists and the Inter-American Orthodontic Congress, New Orleans, La., March, 1942.

It was deemed advisable and urgent to create a masticatory appliance for this patient. Although he was in fair health, his stomach was giving him a great deal of trouble and, in addition, his system demanded a lot of nourishment.

Study models were made; bites taken and mounted on an articulator. By trial and error with check bites the desired opening was established. This is shown in Fig. 4 and was three-quarters of an inch. To accomplish this opening, the construction of a removable appliance was decided upon.

Fig. 1.

Figs. 5 and 6 show the cast gold appliance to support the teeth and acrylic restoration as it was completed.

Fig. 7 shows the front view before the case was started, and Fig. 8, at the time the case was completed.

Figs. 9 and 10 show the profile views before and after treatment.

From the esthetic standpoint there is a marked improvement.

The functional requirements are satisfactory to mastication and phonetics. In fact, Mr. Earl was very excited when he discovered for the first time

Fig. 2.

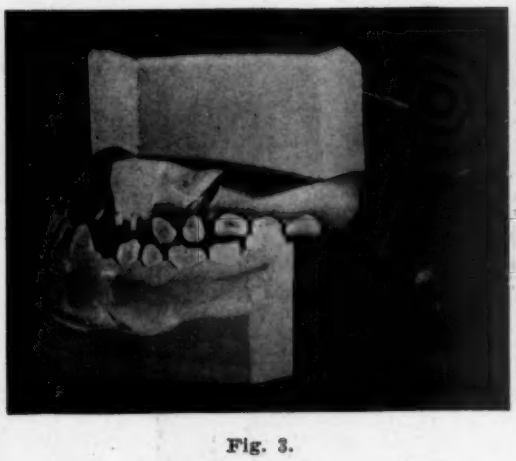


Fig. 3.

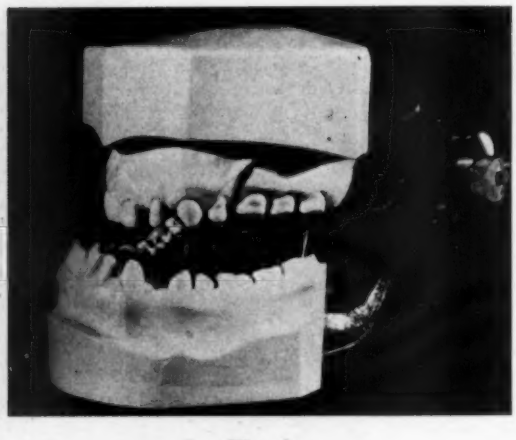


Fig. 4.

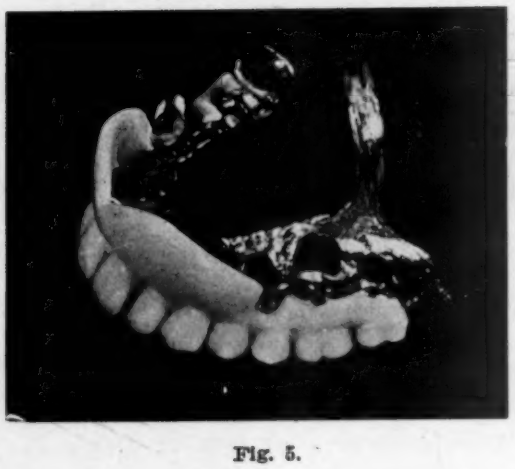


Fig. 5.

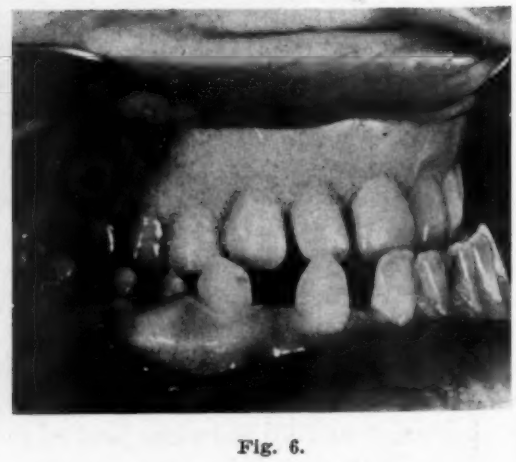


Fig. 6.

the taste of certain foods—in his own words: "The peppery taste of watercress, and the enjoyment of masticating a juicy steak."

The patient was instructed as to the hygiene and the importance of keeping the appliance clean. When he returned some time later, it was noted that he had performed his duties efficiently. He remarked at this time, that it was painful to attempt the overclosure that he originally had.

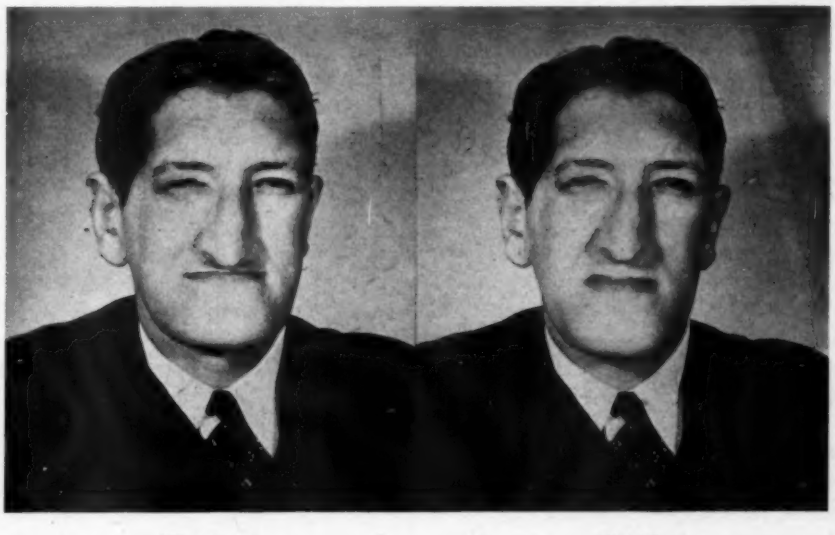


Fig. 7. Fig. 8.

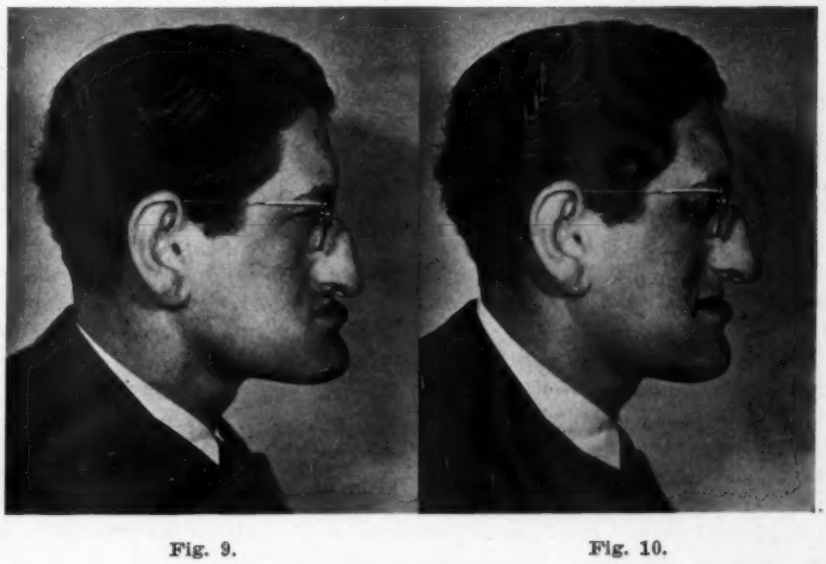


Fig. 9. Fig. 10.

This case demonstrates what dentistry can do for many otherwise unfortunate dental mechanisms. In doing so function and esthetics are restored, and human beings are made healthier and happier.

REPORT OF THE AMERICAN BOARD OF ORTHODONTICS

It may be of interest to review briefly the origin and operation of the American Board of Orthodontics. For many years orthodontists had realized the lack of adequate scholastic and clinical preparation of some men practicing the specialty as well as the lack of a standard of qualifications for orthodontists. After much research and study of this problem, President Albert H. Ketcham of the American Society of Orthodontists (now called the American Association of Orthodontists), at the annual meeting in Estes Park, Colorado, in the year 1929, proposed the creation of the American Board of Orthodontics, patterned after such standardizing bodies as The American Board of Otolaryngology and Ophthalmology in the medical profession. Later at that meeting a resolution for the creation of the Board was unanimously adopted.

Requirements for eligibility to active membership in the American Association of Orthodontists are that the applicant must have been in the exclusive practice of orthodontics for at least three years and that he must be an ethical member of the American Dental Association. Active membership in the American Association of Orthodontists does not imply that such members are capable orthodontists. Rather, it provides the privilege of attending the meetings and participating in the activities of the organization, with the opportunity of improving professional qualifications through excellent scientific programs and personal acquaintances.

Dr. Ketcham and many others believed that the establishment of a standard of orthodontic fitness, such as the Board would provide, would prove as valuable to orthodontics as do the Examining Boards in the specialties of medicine and, in addition, would act as a stimulus for further study and more comprehensive preparation in the field of orthodontics. Results prove that this theory was correct.

When the Board of seven Directors was elected by the American Association of Orthodontists, Dr. Ketcham was immediately chosen as President, an office he held for six years. As this Board was the first organization of its kind in the dental profession, there were numerous problems to be solved and many unexpected obstacles to be overcome. However, as a result of genuine cooperation on the part of the Directors, under the able and enthusiastic leadership of Dr. Ketcham, the Board safely passed through its infancy, and we now feel that it is a well-organized influence for the improvement of orthodontics.

Probably few members realize the large amount of work involved in the activities of the Board. There is much correspondence throughout the year and Directors read every thesis and examine all of the case reports submitted by applicants for certificates.

The Board meetings are held in advance of the meetings of the American Association of Orthodontists, and while we plan to complete our work on time, experience has proved that every year, unexpected developments have required additional sessions and have prevented the Directors from attending some of the sessions of the American Association of Orthodontists. This statement is not made in the nature of a complaint for we are proud to have the honor you have conferred upon us and we are willing to do whatever is necessary for the proper functioning of the Board.

Including 1941 there have been 215 certificates of qualification granted to applicants located in thirty of the United States, the District of Columbia, and in three Canadian provinces. Other certificates will be granted after this current meeting. The Board is very proud of this record.

The courtesy, cooperation, and fairness experienced in our associations with applicants have been a continued source of genuine satisfaction. In some cases the material first submitted by applicants has not been of an acceptable standard and applicants were given more time to fulfill the requirements. In practically every case of this kind, the applicant returned with new material, which the Board accepted as adequate.

The standards of qualification can never be static but must continue to rise in proper ratio to the continued advancement of orthodontics.

The number of applications for certificates received this year is less than usual. Perhaps this is on account of the National Emergency or possibly this is a condition which might be expected at this period in the life of the Board.

One of the most trying problems the Board has had to deal with is the matter of eligibility of applicants who desire certificates of qualification. On a number of occasions the Board has been informed that certain applicants were not ethical in their conduct and that they did not measure up to the high standards expected of true professional men. The Board has no legal right and no desire to rule on such problems. If a man is a member in good standing in his local dental society, the Board must presume that he is ethical and that his conduct is satisfactory to his local associates. As an additional aid in this problem, the Board adopted a resolution which is as follows:

> "Upon receipt of an application for a certificate, the Secretary shall communicate with the Secretary of the Sectional Orthodontic Society to which the applicant belongs and secure information concerning the ethics and professional standing of the applicant."

This will put the responsibility where it belongs and the Board will act in accordance with the information received.

I wish to express the genuine appreciation of the Board to the American Association of Orthodontists as an official organization and to the individual members for their many acts of kindness and cooperation.

CHARLES R. BAKER, President

Department of Orthodontic Abstracts and Reviews

Edited by

Dr. J. A. Salzmann, New York City

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City.

Rapid Treatment in Certain Types of Malocclusion: By Bert G. Anderson, *J. A. D. A.* **29**: 577-582, 1942.

The slow movement of teeth in the treatment of malocclusion has been advocated by orthodontists as a cardinal principle of practice. "It has been believed that movement faster than what has been termed the 'physiologic rate' is *apt* to cause (1) bone resorption, leading to loosening or loss of the teeth, (2) root resorption, (3) destruction of the dental pulp, and (4) excessive pain." A review of the orthodontic literature impressed Anderson with the fact that "no one has seriously questioned the validity of the concept of a physiologic rate of movement nor doubted that permanent injury to the teeth results when treatment deviates from this principle."

During recent years, patients with certain types of malocclusion have been selected at the New Haven Hospital Dental Clinic for experimental orthodontic treatment and observation in order to attempt a simplified method of treatment, to test the principle of slow physiologic movement, and to study the results of partial or regional treatment over short periods of time.

Since 1934, a group of twenty-four patients, fourteen boys and ten girls, have been selected for this investigation. All were white children and ranged from 8 to 15 years of age at the onset of the treatment. Only patients with one or more anterior maxillary teeth in lingual version were selected for treatment. In most cases, the opposing mandibular incisors were more or less labially displaced, and, in some instances, the entire mandible was a half-cup width or less in anterior relation to the maxilla.

The patients were divided into two groups, and two different techniques of therapy were employed. In one group, consisting of nineteen patients, brass wire ligatures, 26 gauge, were fixed to those teeth that were out of alignment. The wires were bent into staplelike forms and passed from the labial to the lingual side around the maxillary teeth and from the lingual to the labial side around the opposing mandibular teeth. The two ends of each ligature were twisted tightly as the wire was drawn around the cervical portion of the tooth. These twisted wire ends on opposing maxillary and mandibular teeth were then united across the incisal edges in order to hold the jaws together and to form a sort of guide plane to prevent the teeth from assuming their former malocclusal relationships, while they also served to guide the teeth toward normal occlusion. In cases wherein the ligatures tended to slip off the more peg-shaped mandibular incisors, two approximating teeth were tied together to serve as antagonists for

one maxillary incisor. Similar ligatures were also placed on two opposing more bell-shaped bicuspids or molars on each side without crossing the bite, in order to prevent the patient from dislodging the anterior wires by tugging at them in attempting to open the mouth.

In the second group, consisting of five patients, bands with spurs instead of intermaxillary wires were employed to obtain movement of the teeth. This method was used chiefly where it was difficult to secure wire ligatures to the tooth crowns because of their peg shape or insufficient eruption. A case was illustrated in which this appliance was placed on the mandibular incisors in order to bring the maxillary incisors into alignment. Bands with lingual spurs were constructed and cemented in place in such a manner as to guide the teeth to correct positions. The spur consisted of a piece of half-round wire, heavy enough to withstand the occlusal stress, which was soldered to the lingual portion of the band. This portion of the band was also reinforced considerably by allowing a quantity of solder to flow over the lingual surface. The spur was allowed to extend beyond the band and rest against the palatal aspect of the maxillary incisor. In order to support the weaker mandibular incisor, which otherwise would have had to bear the whole force of the bite against the maxillary incisor, a piece of bar metal was attached to the band on the labial surface and made to rest against the approximating teeth for anchorage. A band and spur of this type served as an inclined guide plane. With this appliance, teeth were moved into alignment satisfactorily, while the patient had the advantage of a limited use of the jaw during treatment. By this method, however, the teeth were under less direct control for observation purposes, and movement in some cases was slowed considerably. This device was also employed for retention of corrected positions, owing to a shallow overbite.

In beginning treatment, patients were advised that they should expect some discomfort; that there would be no difficulty in furnishing them with a nutritionally adequate diet which could easily be taken into the mouth between the teeth, and that there would be only a slight speech impairment with the jaws fixed in position. The patients who were attending school continued with their classwork without much difficulty. During treatment, patients were required to visit the clinic four times the first week and three times the second week for inspection, for the taking up of the slack in the wires, or for readjustment of the guide spurs. Thereafter, they returned for inspection and follow-up records once a week for a month and again after intervals of six weeks, three months, and six months. Although the experimental period was considered to be over after one year, some patients have been seen annually for five years.

The technique requiring the wire ligatures was employed in nineteen cases. In seven of these cases, the corrected position of the teeth was maintained by means of retaining bands with attached spurs. Three of the patients had more complicated malocclusion, which required orthodontic correction after the experimental treatment. Of the nineteen cases in which the wire ligature technique was used, two were treated in two days, two in three days, eight required a week, and seven, two weeks or less. This treatment was sufficient to bring the teeth into such relationships that movement toward normal positions followed. In the five cases treated exclusively with the aid of the band spur or guide

plane, the time required for the teeth to assume a correct relationship ranged from one to several weeks. In a number of instances, the improvement extended beyond the region treated and continued with the development of the dentition after the removal of the appliance.

The members of this group have been followed from one to five years in order to observe the development of the occlusion. In all the twenty-four patients subjected to treatment, there was marked correction of the malocclusal deformities. In one who was also suffering from severe periodontal disease, relief was obtained from this condition. No attempt was made to bring about the ideal mechanical occlusion which is commonly the goal of orthodontists.

Since the beginning of modern orthodontics, authorities in this field have stated that bone and tooth root resorption, pulp destruction, and excessive pain will result if excessive force is employed in orthodontic treatment. By means of the minute pressure commonly used, it has been possible to move teeth only exceedingly slowly. This force is generally applied with the aid of rubber elastics or wire springs and consequently is fairly uniform and constant in action.

Although orthodontic appliances in common use are said to be physiologic in action, it is doubtful whether this term is correctly descriptive of a mechanism that is activated by elastics or springs. Rhythmic movement is a rule of nature. A force that is interrupted with recovery periods is certainly more physiologic in action than one that is constant. Interrupted pressure will increase the circulation, while uniform and constant pressure tends to depress or check it. This principle is well recognized in massage.

In the past, many orthodontists have advocated the practice of removing regulating appliances now and then, particularly during the summer months, in order to permit rest periods without active mechanical treatment. Constant pressure in terms of weeks, months, or years interspersed with such rest periods, however, is not comparable to a pressure which is frequently applied and as frequently interrupted. The application of pressure must be followed by an interruption which occurs soon enough to permit relaxation or recovery; in other words, before permanent damage results. For instance, a muscle contracts and then relaxes to permit recovery; or, one changes position during sleep, and thus renewal of circulation occurs in tissues which would otherwise be compressed too long with the body weight.

The presence of guiding wires or spurs on the teeth caused these patients to bite or nibble at them. Considerable force was applied, but the intermittent nibbling action apparently allowed for the necessary recovery of circulation in structures under the influence of a pressure that would otherwise not have been tolerated. This was the kind of force employed in the movement of the teeth in these cases.

No excessive pain was observed in these patients. All experienced a moderate degree of discomfort during the first day or two of treatment. There was, however, no more complaint of pain than is common during the initial stages of conservative orthodontic treatment. Although the jaws were bound together and movement of the teeth was brought about comparatively rapidly,

at no time was stronger force exerted by the operator than when separation wires are applied in conservative orthodontic treatment. The wiring technique described here was not forcefully applied. There was sufficient irritation from the wires, however, to cause the patient himself to exert or make pressure on the teeth as he would, but not to the extent of overforcing them.

In no instance was a tooth "devitalized." Neither teeth nor surrounding bone evidenced resorption on follow-up x-ray examination, nor was any permanent loosening of teeth observed as the result of this treatment. As far as could be determined by clinical and x-ray examination, none of these patients suffered any permanent injury as a result of the treatment. On the other hand, all the occlusal deformities were either corrected or much improved.

This study indicates that (1) more rapid treatment of malocclusion is justified, at least in certain cases, (2) regional and short-period treatment may initiate corrective development which may continue after such treatment has been terminated, and (3) an interrupted pressure which increases the circulation is probably more favorable for tooth movement than a constant one.

J. A. S.

Scalenus Factor in Congenital Torticollis: By S. M. Copland, *Surgery* **11**: 624-631, 1942.

The author presents the following classification of torticollis:

1. Acquired Torticollis:

This is the commonest form, usually known as "stiff neck." It is really a myositis of the sterna mastoid, occasionally the trapezius, due to exposure or changes in temperature.

2. Congenital Torticollis:

   A. Primary congenital torticollis caused by an embryonic defect; viz.: (1) Synostosis of atlas and axis, (2) fusion of atlas and occiput, (3) malformation of cervical vertebrae, or (4) cervical rib.

   B. Secondary congenital torticollis presents no basic anatomical deficiency but is definitely present before birth.

   C. Parturitional torticollis is first noticed anywhere from a few hours to a few weeks after delivery. Underlying pathology: (1) rupture of sternomastoid muscle, (2) hematoma of sternomastoid muscle with subsequent fibrosis, and (3) combination of rupture and hematoma. It is this type (parturitional) of torticollis which is affected by the scalenus anticus muscle.

3. Functional Torticollis:
4. Spasmodic Torticollis:

A group of cases illustrating the various types of torticollis and the therapy employed by the author are presented.

As the result of his clinical observations and operative findings, Copland feels that the action of the scalenus anticus muscle, whose function is to bind the neck to the side and slightly forward and turn it slightly towards the opposite side (Morris, Deaver), plays a role in maintaining the deformity.

Three cases of congenital torticollis are presented wherein the scalenus anticus muscle appears to have played a role in maintaining the deformity. In all of these three cases there appeared a uniform inhibition of muscular development of the facial muscles on the affected side, so that the face on the affected side was smaller and less muscular than on the opposite side.

H. A. S.

A Roentgenographic Cephalometric Appraisal of Untreated and Treated Hypothyroidism: By Milton B. Engel, I. P. Bronstein, Allan G. Brodie, and Phillip Wesoke, Chicago. *Am. J. Dis. Child.* **61**: 1193-1214, 1941.

This is a report on craniofacial growth in children with thyroid deficiency. It is the purpose of this study to indicate the deviations from normal growth which occur and to point out the efficacy of thyroid therapy in inducing developmental progress in the craniofacial areas. It is hoped that the use of a roentgenographic cephalometric technique in the study of abnormal growth will yield some additional information concerning normal developmental progress.

The authors believe that thyroid deficiency does not exert its effects because of a topographic specificity or a peculiar susceptibility of any particular bone or bones. Moreover, it is not certain that the disturbance is pathognomonic of cretinism. The thyroid gland plays a role in the control of cellular metabolism. Absence or deficiency of its secretion exerts adverse effects on those processes, possibly through decreased nutrition.

The retardation in growth is generalized in the cranium and/or face. However, it is likely that a chronologic specificity exists; that is, that the site of delayed growth is determined by the metabolic gradient at the time of disturbance. The greater the activity of a tissue, the greater its vulnerability. It is for this reason that the fetal and immediate postnatal periods are so significant in craniofacial development.

There is good evidence which indicates that the glandular deficiency which leads to the symptoms of clinical hypothyroidism may have its inception during the most critical period of growth, that is, the fetal period. Normally, the center for the distal epiphysis of the femur may be detected roentgenographically at birth. It has been shown that this center is not present in very young patients with hypothyroidism. This might indicate that the differentiating effect of the thyroid was lacking in the prenatal period. In embryonic development the thyroid is one of the first organs to be differentiated, being distinguishable at about the third week. This fact alone suggests its fundamental importance in growth.

The response in the cranium is rather typical. There appears to be a gradient of retardation; the occipital area suffers most severely, the parietal area next, and the frontal area least. This difference in susceptibility to disturbance in development may be an expression of the growth tendencies inherent in these regions and may indicate a growth or incremental gradient from the occipital to the frontal region.

The failure in cranial expansion may be attributed to the reduction of osteoblastic activity on the external and the internal osseous surfaces and at the sutural surfaces, which appeared abnormal roentgenographically.

The shortening of the cranial base is probably explicable on the basis of diminished chondral activity at the spheno-ethmoid and spheno-occipital synchondroses. The latter was shown to be irregular and wider than normal, changes indicative of a disturbance in the epiphysis.

Retardation in anteroposterior facial growth is induced by the lag in the development of the cranial base, which normally carries the upper part of the face forward through its hafting to the anterior portion of the base. The mandibular ramus normally goes backward because of its association with the posteriorly descending temporal bone. Both of these processes suffer in the cretin. The evidence indicates that the dysplasia within the facial area itself is generalized rather than localized. Thus, though individual bones, such as the mandible, the nasal bone, and the maxilla, suffer in their incremental gain, the velocity of growth is slowed generally. Brodie has shown that the developmental trends in the craniofacial patterns of children from the age of 3 months to the age of 8 years follow a straight, apparently predetermined, or inherent course. Similarly, the development of the cretin child appears to follow in the direction of the development of the normal child, which suggests conformity to pattern but at a slowed rate. Further confirmatory evidence, however, is necessary. The growth reaction in the face again is attributed to lowered osteoblastic activity.

The modification in soft tissue profile, which is reported in cretins, is at least partly due to the disturbance in skeletal growth. The dwarfed nasal bone is also responsible for the concave appearance of the nose. The delay in the dental eruption pattern reported for six of the untreated and for one of the treated patients is not a new observation and is a further reflection of retarded development.

Roentgenographic assessment of tooth formation was attempted in the authors' study, but it cannot be considered as accurate a method as histologic examination. Some retardation was suggested by the wide apical foramina of many of the untreated patients. There was no evidence, however, of a small tooth size. Further investigation of this problem is necessary.

The histopathologic basis of the osseous and chondral changes in hypothyroidism has been investigated. An abnormal layer of bone, called *Querbalken,* has been observed at the epiphyseal-diaphyseal junction. This is ascribed to a diminution in the activity of the marrow, resulting from thyroid hypofunction. Observations on a 10-year-old male cretin revealed that ossification of the capital epiphysis of the femur had not yet begun but that the altered cartilage offered clear evidence of perversions of orderly bone development. In some places the cartilage had apparently disintegrated and been replaced by cystic areas filled with a dark-staining fluid.

It has been shown that both dental and ossification patterns respond rapidly to treatment. This is confirmed by the normal development of dentition and ossification in most of our treated patients and is suggestive of some similarity in mechanism in eruption and ossification, which are both differentiative processes.

The difference in the craniofacial, dental, and ossification patterns which were demonstrated in the series presented not only shows the effects of a thyroid

deficiency, but also demonstrates the efficacy of thyroid therapy in maintaining the developmental processes involved in the growth of these structures.

In general, the differences which existed between normal controls and treated cretins of the same age were not marked. This leads one to conclude that when thyroid therapy is begun at an early age, there is at least a possibility for good, though not necessarily optimal, development and that the degree of response may be related to the dosage as well as to Todd's constitutional "scarring."

Craniofacial, dental, and carpal ossification patterns of development of untreated children with hypothyroidism lag behind those of children given thyroid therapy. The deficiency in the cranium lies in the occipital, the parietal, and, to much lesser extent, the frontal area. The cranial base is shortened, and the spheno-occipital synchondrosis and the sutures of the vault are abnormally wide. The face shows a generalized retardation of growth as a result of the slowed velocity of growth of its components; that is, the mandible, the maxilla, and the nasal bone. The teeth are delayed in their eruption, but they are not malformed. Differentiation and ossification of carpal centers are disturbed and retarded, and the roentgenograms show persistence of infantile characters.

Craniofacial, dental, and carpal patterns of development in untreated children with hypothyroidism are retarded when compared to those of normal subjects of the same age. The differences are merely an accentuation of those noted between treated and untreated cretins.

Children with hypothyroidism who have been treated regularly since early childhood closely approach normal levels of craniofacial development. Their pattern of dental development and progress in ossification are normal. Thyroid deficiency affects craniofacial growth by retarding its velocity rather than by modifying its pattern.

The Microscope: By Simon Henry Gage, Emeritus Professor of Histology and Embryology in Cornell University. Seventeenth edition, revised. Pp. 617. Price $4.00. Ithaca, N. Y.: Comstock Publishing Company, Inc., 1941.

This standard work has again been revised both in text and in illustrations. The newly devised electron microscope with its greatly increased magnifying power and resolution over the ordinary microscope is discussed. Attention is called to polaroid for the micro-polaroscope and to some new plastics for mounting in place of Canada balsam. The microscope and its parts are discussed and illustrated in detail.

Among the various types of microscopes discussed are the following: bright field microscopes, dark field microscopy, the polarizing microscope, the micro-spectroscope, and the ultraviolet microscope. Photographing with the microscope is explained, and the apparatus employed is fully illustrated. Directions are included for fixing, cutting, and staining objects. Special emphasis is placed on the study of living and fresh tissues wholly unmodified by fixers and stains.

This encyclopedic work, now in its seventeenth edition, has been a stand-by since 1908 of those who employ the microscope. In the present edition the

bibliography has been brought up to date and a detailed index has been provided. The price is so reasonable as to bring it within the reach of everyone who employs the microscope.

J. A. S.

End Results in the Cretin: By Charles Gilmore Kerley, M.D. *Arch. Pediat.* **57**: 432, 1940.

Two cases of congenital myxedema of the textbook type are presented with detailed history and illustrations. Both these children pass as physically and mentally normal in school contacts and social activities.

Six other female cretins who have been under observation since infancy are now normal individuals as regards height, weight and mental endowment. They range in age from 16 years to 40 years. They are in good physical health and occupy social planes according to birth; only the immediate families are aware of the congenital dyscrasia.

The end results were acquired by the administration of desiccated thyroid (Parke Davis & Co.) in subtoxic dosage carried on under controlled medical observation in families sufficiently privileged to supply adequate home care.

In prescribing desiccated thyroid gland it is essential that the fresh product be employed; a failure of therapeutic response may be due to the lack of potency because of the deterioration that results from age and exposure. The author has learned this in his work with cretins and others who are outstanding subjects in thyroid gland deficiencies.

Editorial

Chrome Alloy and Orthodontics

The President of the American Dental Association, Dr. Oren A. Oliver, appointed a Committee of the A. D. A. to confer with the War Production Board and other Boards in Washington. The Committee and the Board have taken up problems of material and supplies necessary for the conduct of dental practice with the hope in view of being able to devise ways and means of allocating important dental supplies to the best interest of the war effort and as related to the health professions.

It may be said now that decisions have been made by the board in regard to two items at least; that is dental burs and chrome alloy materials. The dental committee appointed to confer with the Board is George M. Anderson, Chairman, Harry Bear, and Henry Swanson. In cooperation with the above committee, Dr. James A. Burrill, President of the A. A. O., in conjunction with a special committee headed by Dr. Paul Hoffman, set about to secure information and data pertaining to the expectancy of requirements which might be necessary for orthodontic practice throughout the country for a period of one year, on the particular item of stainless steel. This information was secured from orthodontists and manufacturers of stainless steel orthodontic items, and a final figure was fixed in the amount of 3,000 pounds. The request made by the Committee was then presented to the iron and steel branch of the WPB. The following letter to the Chairman of the Committee, Dr. Anderson, will explain their position:

> Reference is made to our conversation of this date in regard to stainless steel for orthodontic work.
>
> This problem has been before us a good many times and has been given very careful consideration. In the light of present conditions and the fact that substitutes, although perhaps inferior, are available, it is felt that we must reject this appeal.
>
> As I told you on the telephone, we have been forced in recent months to remove from mill schedules extremely important items in the direct war effort—items which are actually used in battle. It is the policy of this Unit to reject applications rather than to supply a priority rating which would not obtain the material desired. We feel that we owe the applicant that courtesy.
>
> This year we must make our efforts count more than at any other time. We feel that all critical materials must be confined to the requirements of the armed services. It is hoped that at some future date relief may be given to the deserving civilian public.
>
> I am sure that we will have your full cooperation in our efforts.
>
> Very truly yours,
>
> R. L. Greenamyer,
> Iron & Steel Branch

To this letter, Dr. Anderson replied as follows:

> I have your letter with reference to stainless steel and while I can understand the great necessity for war materials, it is a fact that certain civilian activities are essential and among these are those which deal with the welfare and health of children, especially those who are unable to pay the fees required in private practice. Clinics have made great use of stainless steel and so have the private practitioners where the cost item determines whether treatment will be given.
>
> We hope that stainless steel will be available in the future for this service and in the meantime I am deeply appreciative of your letter, though regretting its contents.

On account of the critical materials involved during the war emergency, obviously the Committee has had a difficult task to perform, and it is now most unfortunate that orthodontic practice is to be deprived of this important material for use in the treatment of cases. Many practitioners have built their treatment plans upon the use of stainless steel. In certain of these techniques there is no substitute for steel because of the great resiliency required of wires of extremely small gauge. It is not practical for many practitioners to develop quickly a new method of treatment without bad effect upon their abilities and service to their patients. In addition, many clinics depend a great deal upon chrome alloys. Particularly is this true in clinics where the pay consideration is small and in which indigent patients are treated on the cost of appliances basis.

There can be no question that orthodontists as a group are as eager to cooperate in the great war efforts and sacrifice as any and all groups. Notwithstanding, the item of 3,000 pounds of stainless steel is of such vital importance to this branch of health service, and at the same time bears such a microscopic relation to the entire picture as a whole, that it seems the decision of the iron and steel division of the WPB does not, to say the least, square with the civilian and military health policies as outlined to professional groups by the division of Procurement and Assignment Service.

Orthodontists are very much exercised over this important decision and cannot believe that the amount of 3,000 pounds of chrome alloy, which might be allocated to orthodontists so vital to their patients, is any more than the traditional "drop in the bucket" to the chrome alloy output for the war effort as a whole. It is to be hoped that the WPB will give the subject the mature consideration that it is rightfully entitled to, as a health measure where it properly belongs.

H. C. P.

News and Notes

Research Section, American Association of Orthodontists

At the present time there is no opportunity afforded men interested in orthodontic research to meet together and discuss their problems. At the last meeting of the American Association of Orthodontists it was proposed that the Research Committee be empowered to arrange a portion of the program for the next annual meeting.

The program will consume one-half day and will be restricted to ten- or fifteen-minute reports by men actively engaged in research in orthodontics, or in its allied fields. Time will be allowed for discussion of all presentations, in order that the greatest benefit may accrue to those participating. All institutions and all individuals are invited to request time.

For further information or time reservations on the program address communication to

ALLAN G. BRODIE, Chairman
Research Committee, A. A. O.
30 North Michigan Avenue
Chicago, Illinois

New York Society of Orthodontists

The next or Fall Meeting of the New York Society of Orthodontists will be held at the Waldorf-Astoria Hotel, New York City, Nov. 9 and 10, 1942.

Prize Essay Contest

The Research Committee of the American Association of Orthodontists has been empowered by the Board of Directors to conduct a prize essay contest. The prize has been set at $200.00 and will be offered annually until further notice. The terms of the competition are as follows:

Eligibility.—Any student enrolled in a recognized university, or any person who has completed his or her formal education in orthodontics not more than three years prior to Jan. 1, 1943, is eligible to compete for the prize.

Essay.—The essay must represent a piece of original research having a direct bearing on the field of orthodontics. It may relate either to a biologic or clinical problem and may represent material that has been offered in partial fulfillment of the requirements of a graduate or postgraduate degree, or any graduate, postgraduate or undergraduate contest. No previously published essay will be accepted. All essays must be in the hands of the committee by Jan. 31, 1943. If no essay is deemed worthy by the committee, the prize will be withheld.

Award.—The prize-winning essay will be accorded a place on the scientific program of the annual meeting of the Association, at which time the prize will be awarded. The Association will retain publication rights on the first three choices.

For further information, address

ALLAN G. BRODIE, Chairman
Research Committee, A. A. O.
30 North Michigan Avenue
Chicago, Illinois

The Orthodontist and the War

An interesting bulletin has been sent out from the Southwestern Society of Orthodontists which is herewith printed for the benefit of the readers of the AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY. In order that the facts may be carried just as sent out by the Southwestern Society, certain correspondence is published which reveals the situation.

BULLETIN

D:HGB

Bureau of Medicine and Surgery
Navy Department, Washington, D. C.
Refer to No. (ODR/P14-1)
Washington, D. C.
June 25, 1942

Dear Doctor Sorrels:

Your letter of June 23, 1942 is acknowledged.

Please be advised that orthodontic treatment as a specialty is not provided for the personnel of the Navy. This can be understood when it is realized that only persons on the active or retired list of the Navy are eligible for medical attention. The families of the officers are not considered eligible for constructive dental treatment of any description, therefore, no field for orthodontia exists in the naval service.

As a general policy, the Bureau of Medicine and Surgery is recommending candidates for commission only in the Dental Corps Reserve for general service. The age governs the appointment, hence, only dentists of 35 years or less are considered eligible for commission as Lieutenant (jg) in the Naval Reserve. A circular of information regarding the Naval Reserve is forwarded for your information. Pertinent data is underlined in red for your guidance.

It is hoped this reply furnishes you the data you require for your publication.

Thanks for your letter.

Sincerely,

A. KNOX, CAPTAIN (DC), USN

. . . . . .

GRADE	AGE LIMIT IN YEARS		
	Organized Reserve	Volunteer, general	Volunteer, special
Lieutenant Commander	(no vacancies)		37-50
Lieutenant	(few vacancies only)		33-44
Lieutenant—Junior grade	(open)	21-35	27-38

(Upper age limits are to the nearest birthday)

Dental Officers, Volunteer Reserve (special service), Class DC-V (S)
(only a few vacancies in this class)

(1.) Dental officers, Volunteer Reserve (special service), class DC-V (S) may be appointed within procurement quotas upon presentation of satisfactory credentials, which may be accepted as qualifying the candidate for appointment without professional examination.

(2.) A candidate for appointment in this class must present the following credentials as to education and professional qualifications:

(a) Certificate of dental education giving name of school, date of graduation, signed by the dean or registrar.

(b) A certificate from the president or secretary of a national, state, or local dental society to the effect that the applicant is a member in good standing.

(c) A certificate of license to practice dentistry.
(d) Evidence of qualification in specialty; or a statement of time spent in general practice (minimum, 1 year).

(3.) The grade and rank in which candidates for class DC-V (S) are appointed will be determined by the candidate's age, professional standing, and academic seniority. It must be appropriate to the duties of the mobilization assignment.

. . . . . .

Committee's Note

A strict interpretation of the sections governing voluntary enlistment for specialists indicates that bona fide orthodontists may file applications for commissions of Lieutenant (Junior Grade), Lieutenant and Lieutenant Commander respectively, in accordance with the age scale and the other determining factors. The relative need as indicated by current vacancies is likewise an important factor. This latter is, of course, subject to change.

It is suggested that those choosing to file applications for commissions should carefully investigate their possibilities in regard to rank in the higher brackets.

Public Relations and Military Affairs Committee

T. W. SORRELS, Chairman
CURTIS WILLIAMS, Secretary

Inasmuch, as the question of the continuation of orthodontic treatment has come up in connection with the Selective Service in the practices of a number of orthodontists, it is thought the following memorandum from the Public Relations and Military Affairs Committee of the Southwestern Society of Orthodontists, would be of interest to the readers of the JOURNAL. It is thought as well that the publication of the enclosed letter from Col. L. G. Rowntree, Chief of the Medical Division, pertaining to this subject, will be of general interest.

Memorandum

It is suggested that the policies laid down in the enclosed letter of July 6, 1942, from National Headquarters of Selective Service System be pursued. In addition it is suggested that no action be taken in behalf of prospective orthodontic patients for deferment if they are found acceptable to Examiners, unless it be highly justified.

It is further suggested that all inducted orthodontic patients be referred to civilian orthodontists for future follow-up care on a progressive basis in line with their traveling orders and stations to which they are assigned.

There can be no assurance that they will receive adequate care by the military dental personnel. Even though qualified men are available in certain military areas, they cannot be assured of proper orthodontic treatment due to inadequate orthodontic equipment and supplies.

Frugal officers and enlisted men both should be able to meet the cost of service providing proper consideration is given to the financial problem attending each individual case.

Respectfully submitted for your information and consideration.

Public Relations and Military Affairs Committee

T. W. SORRELS, Chairman
CURTIS WILLIAMS, Secretary

NATIONAL HEADQUARTERS

SELECTIVE SERVICE SYSTEM

21st Street and C Street, N. W.
Washington, D. C.

July 6, 1942.

In replying address
The Director of Selective
Service and refer to
No. 12-7.6-73

Dr. T. W. Sorrels
Chairman, Public Relations and
Military Affairs Committee
Southwestern Society of Orthodontists
1003 Medical Arts Bldg.
Oklahoma City, Oklahoma

Dear Doctor Sorrels:

Reference is made to your letter of June 24, 1942, addressed to Commander C. R. Wells, requesting information covering the problem of patients under orthodontic care.

There can be no assurance that a registrant undergoing orthodontic care can be deferred to enable him to have the case finished. Dentists should be reluctant to commence orthodontic treatment for patients who may be liable for service, under the Selective Training and Service Act of 1940, as amended, before the case can be satisfactorily completed.

Should a registrant be required to enter the armed forces before the orthodontic treatment is completed, orthodontists should insert suitable retaining appliances to maintain the dental arches in the position attained for the duration.

It may be that certain cases commenced prior to December 7, 1941, are at a treatment stage that would physically incapacitate a registrant for immediate military service; or that cessation of the treatment might cause facial deformity. Deferment for these cases may be requested so that they can be brought to a stage where retaining appliances will suffice for the duration. In such cases the orthodontic treatment should be directed to fixation for retainers rather than ideal correction.

For the Director,

L. G. ROWNTREE
(Colonel, Med.-Res.)
Chief, Medical
Division

Public Relations Information

At the last meeting of the American Association of Orthodontists held in New Orleans in March of this year, the Board of Directors, after due consideration, voted to discontinue the activities of the Bureau of Public Relations as of May 1, 1942.

Even though the Bureau has been most instrumental in rendering valuable service to the public and the professions, the Board has undoubtedly acted wisely at this time.

It had furthermore become apparent that the central office was handicapped and limited in its effect without more active coordinated participation of the regional societies through their respective Public Relations Committees.

Suspension of the activities of the Central Office was recognized in general as being a most regrettable thing in view of its splendid record and possibilities of further expansion through active participation by the district organizations. As a substitute measure, it was

the consensus of opinion that these organizations should set up an active agency through their respective Relations Committees to carry out an orderly program similar to the methods and policies of the former Bureau.

Acting upon that opinion, the Southwestern Society decided to activate their own Public Relations Committee by a substantial appropriation for this fiscal year and directed the chairman, Dr. T. W. Sorrels, to appoint one of the other Committeemen as secretary to carry forward a program patterned after the Bureau and make its educational material available for the use of its members; this to be supplemented with such additional material and special projects and policies as the Committee and Society deemed advisable and desirable. Dr. Curtis Williams, Medical Arts Bldg., Shreveport, La., was appointed secretary.

The Southwestern is to be complimented upon its prompt action and the remaining regional societies will do well to copy the procedure.

The New York Society has formed such an arrangement and will function in the same manner.

It will be most pleasing to the Public Relations Committee to learn that the remaining societies are going forward with this Public Relations movement as it is a field which offers many opportunities to serve the public and the specialty to a constantly greater advantage.

Your Public Relations Committee wishes to advise that it is in position to supply the membership with the material listed below while the supply lasts. There will be no further printings until it is deemed advisable by the Board.

Getting Ready to Tackle Life

50 copies	$1.00
100 copies	1.50
500 copies	5.00
1,000 copies	7.50

Crooked Teeth. Do Not Let Them Spoil Your Child's Looks

Same prices as above.

Facts About Orthodontics for Health Workers

25 copies	$ .50
100 copies	1.50
250 copies	3.50
500 copies	5.00
1,000 copies	7.50

General Health Benefits of Orthodontic Treatment

10 copies	$ .90
25 copies	2.00
50 copies	3.75
100 copies	5.00

Send all orders direct to Dr. Henry U. Barber, 5 East 57th Street, New York City, N. Y. Make all checks payable to

Public Relations Committee, A.A.O.

Submitted by the Public Relations Committee

BEN L. REESE
HOMER B. ROBISON
HENRY U. BARBER, JR., Chairman

Aug. 14, 1942

Certified by American Board of Orthodontics

The following men were certified by the American Board of orthodontics at its Spring meeting, 1942:

Charles S. Adelstein——929 Rose Bldg., Cleveland, Ohio
Walter R. Bedell——49 Market St., Poughkeepsie, N. Y.
Reuben L. Blake——Butler Bldg., San Francisco, Calif.
James Hilliard Hicks——213 David Whitney Bldg., Detroit, Mich.
Brooks Juett——1112 First Nat'l Bank Bldg., Lexington, Ky.
Harold J. Noyes——55 East Washington St., Chicago, Ill.
C. T. Rowland——1134 Nix Bldg., San Antonio, Texas
William S. Singer——350 Central Park West, New York, N. Y.

Awarded Columbia University Certificates of Proficiency

Certificates in Proficiency in Orthodontics were awarded by Columbia University in June, 1942, to the following:

	Dental Degree From
Dr. Hugh M. Hunsucker Charlotte, N. C.	Atlanta Southern Dental College
Dr. Sidney Kohn 5922 Bergenline Ave., West New York, N. Y.	Atlanta Southern Dental College
Dr. Stephen G. Lee 144 Harrison St., East Orange, N. J.	McGill University
Dr. Clare F. McCreary 4724 North East 1st Ave., Miami, Fla.	Ohio State University
Dr. Fred F. Schudy Second Nat'l Bank Bldg., Houston Texas.	Washington University
Dr. Bernard Wolf 457 New Point Road, Elizabeth, N. J.	University of Pennsylvania

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Notes of Interest

Dr. Fred Schudy is associated with Dr. Albert Westfall in Houston, Texas, in the practice of orthodontics.

Dr. Hugh Hunsucker is doing orthodontic work at the office of Dr. Amos Burgardner, Charlotte, N. C., until called for duty in the Army Dental Corps.

Dr. W. B. Childs announces the removal of his offices from the Persons Bldg., Mulberry Street, to Bankers Insurance Bldg., 666 Cherry St., Macon, Ga.

Dr. Patricia W. Hill announces the removal of her offices from Cleveland, Ohio, to 1049 Main Street, Wheeling, W. Va.

The AMERICAN JOURNAL OF ORTHODONTICS AND ORAL SURGERY feels that its readers would be glad to be informed of the change of address and location of any orthodontists who have entered the armed services. If this information will be sent direct to the editor, 8022 Forsythe Blvd., St. Louis, Mo., it will be published from time to time in the *News and Notes* pages of the Journal.

OFFICERS OF ORTHODONTIC SOCIETIES*

American Association of Orthodontists

President, J. A. Burrill - - - - - - - - - - - 25 East Washington St., Chicago, Ill.
Secretary-Treasurer, Max E. Ernst - - - 1250 Lowry Medical Arts Bldg., St. Paul, Minn.
Public Relations Bureau Director, Dwight Anderson
- - - - - - - - - - - - - - - - - - 292 Madison Ave., New York, N. Y.

Central Association of Orthodontists

President, Harold J. Noyes - - - - - - - - - 55 E. Washington St., Chicago, Ill.
Secretary-Treasurer, L. B. Higley - - - - - - - - 705 Summit Ave., Iowa City, Iowa

Great Lakes Society of Orthodontists

President, Henry D. Cossitt - - - - - - - - - - 942 Nicholas Bldg., Toledo, Ohio
Secretary-Treasurer, C. Edward Martinek - - - - - - 661 Fisher Bldg., Detroit, Mich.

New York Society of Orthodontists

President, E. Santley Butler - - - - - - - - 55 Locust Ave., New Rochelle, N. Y.
Secretary-Treasurer, Norman L. Hillyer - - - - Professional Bldg., Hempstead, N. Y.

Pacific Coast Society of Orthodontists

President, Ben L. Reese - - - - - - - - - - - Roosevelt Bldg., Los Angeles, Calif.
Secretary-Treasurer, Earl F. Lussier - - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, George H. Siersma - - - - - - - - - 1232 Republic Bldg., Denver, Colo.
Secretary-Treasurer, Curtis L. Benight - - - - - - 1001 Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, M. Bagley Walker - - - - - - - - 618 Medical Arts Bldg., Norfolk, Va.
Secretary-Treasurer, E. C. Lunsford - - - - - - 2742 Biscayne Blvd., Miami, Fla.

Southwestern Society of Orthodontists

President, E. Forris Woodring - - - - - - - - - Medical Arts Bldg., Tulsa, Okla.
Secretary-Treasurer, R. E. Olson - - - - - - Union Nat'l Bank Bldg., Wichita, Kan.

American Board of Orthodontics

President, William E. Flesher - - - - - - 806 Medical Arts Bldg., Oklahoma City, Okla.
Vice-President, Frederic T. Murlless, Jr. - - - - - 43 Farmington Ave., Hartford, Conn.
Secretary, Bernard G. deVries - - - - - - - - Medical Arts Bldg., Minneapolis, Minn.
Treasurer, Oliver W. White - - - - - - - - 213 David Whitney Bldg., Detroit, Mich.
James D. McCoy - - - - - - - - 3839 Wilshire Blvd., Los Angeles, Calif.
Joseph D. Eby - - - - - - - - - - 121 E. 60th St., New York, N. Y.
Claude R. Wood - - - - - - - - - Medical Arts Bldg., Knoxville, Tenn.

Harvard Society of Orthodontists

President, Harold J. Nice - - - - - - - - - 475 Commonwealth Ave., Boston, Mass.
Secretary-Treasurer, Edward I. Silver - - - - - - - - 80 Boylston St., Boston, Mass.

Washington-Baltimore Society of Orthodontists

President, Paul W. Hoffman - - - - - - - - 1835 Eye St., N. W., Washington, D. C.
Secretary-Treasurer, Stephen C. Hopkins - - - - - 1726 Eye St., Washington, D. C.

Foreign Societies†

British Society for the Study of Orthodontics

President, S. A. Riddett
Secretary, R. Cutler
Treasurer, Harold Chapman

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*The Journal will make changes or additions to the above list when notified by the secretary-treasurer of the various societies. In the event societies desire more complete publication of the names of officers, this will be done upon receipt of the names from the secretary-treasurer.

†The Journal will publish the names of the president and secretary-treasurer of foreign orthodontic societies if the information is sent direct to the editor, 8022 Forsythe, St. Louis, Mo., U. S. A.